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STEEL

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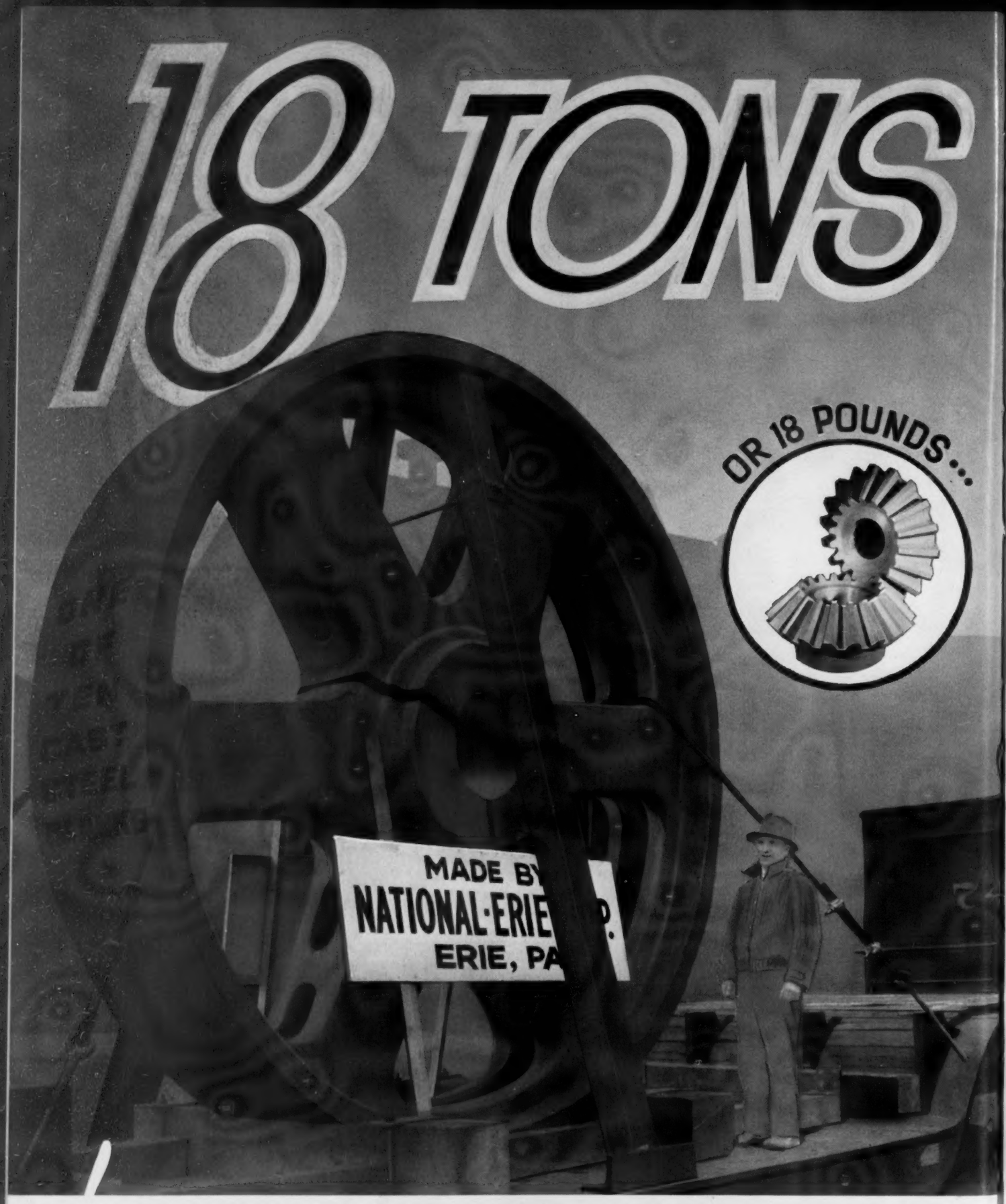
PRODUCTION · PROCESSING · DISTRIBUTION · USE



# of CAST STEEL GEAR BLANK

HERE is proof of the facilities offered you by the National-Erie Corporation . . . One of ten cast-steel gear blanks for mine hoists 145.5" Outside Diameter; 30" Face; 27" Bore; Casting Weight, 36,630 lbs. each. Compare this giant with the small Neloy alloy steel cut gears . . . Your inquiries for steel castings and special gearing will receive prompt attention.

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STEEL
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As the Editor Views the News

■ ONE of the particularly gratifying features of the present status of business is the uplift in the demand for machine tools, foundry equipment and other so-called capital goods. This is due for acceleration as a result of increased industrial expansion. More new plants in various types of industry are springing up here and there all over the country. STEEL this week (p. 24) presents an impressive summary of expansion in the aviation industry; a large amount of new capital is flowing into this industry, to be expended largely for new facilities including machinery and other plant equipment. . . . After faltering over the holidays, STEEL'S index of industrial activity (p. 33) again is ascending. . . . Steel production is steady (p. 18) at 51½ per cent of ingot capacity.

♦ ♦ ♦

"Fixing" vs. "Finding"

First of the large steel companies to report on last year's earnings is Bethlehem Steel Corp. It reports a net profit (p. 17) of $3,658,160 for the fourth quarter. For 1938 its total net profit was $5,250,239, compared with $31,819,596 in 1937. Determination by the department of labor of minimum wages at eastern steel mills engaged in government work was characterized by President Grace as not a case "of rate finding, as designed under the law, but of rate fixing.". . . Buoyant sentiment dominated the canners' convention last week; steel men estimated (p. 19) tin plate consumption this year will increase 25 per cent. . . . STEEL'S estimate (p. 15) is that 4500 tons of stainless steel now is consumed annually in manufacturing restaurant, hotel, bakery and club equipment.

♦ ♦ ♦

Increases Sales

Industrial advertising is regarded by the president of the National Machine Tool Builders association (p. 20) as a potent means for increasing sales and for improving relations with customers and the general public. . . . The battle to revise the national labor relations act was on last week (p. 26) when two proposals were submitted; that requested by the American Federation of Labor seems assured of considerable support. . . . Dr. Albert Sauveur, internationally known for his contributions to the advancement of metallurgy (p. 23), is dead at Boston. . . . Because some parts expand or contract as much as 0.0001 to 0.001-inch if plant temperature varies 5 degrees on either side of 70, ingenious methods are used (p. 30) to safeguard accuracy against sudden weather changes.

♦ ♦ ♦

Best in the Long Run

Private enterprise rather than governmental participation in industrial affairs in the long run will bring the greatest good to the greatest number of our people in the form of pleasant and profitable employment. That is the conclusion advanced by an industrial executive (p. 36) who is associated with a company well-known for its good industrial relations. . . . Newly developed is a process for producing composite metals (p. 38) by means of the carbon arc. Alloy is melted directly on the hot steel ingot prior to rolling; the method automatically prevents rolling of defective material and offers low costs. . . . Improvements in controls in electric welding (p. 42) is having a profound effect on the design of equipment.

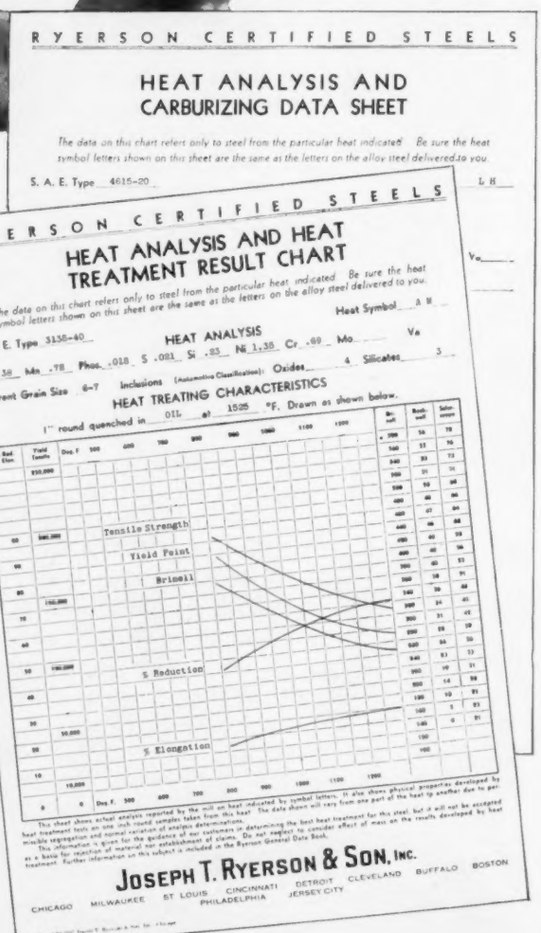
♦ ♦ ♦

Simple Ingenuity

Many operating troubles in steel mills are cured by means that prove relatively simple after considerable ingenuity has been expended on their development. Three ideas recently applied at a continuous strip mill (p. 47) have eliminated spoilage of product during rolling and removed a safety hazard. At another plant (p. 48) heat remaining in ingot molds after stripping is used to heat cold and wet molds. . . . A new method permits deposition of nickel on aluminum, pewter and other white metals (p. 48) without use of a copper undercoating. . . . Welded construction (p. 52) is estimated to have reduced, by 67 per cent, the cost of a huge machine which continuously spins, processes, dries and twists rayon yarn. . . . The Irvin works (p. 62) is featured by an unusual storage battery charging station.

E C Kreutzberg

Valuable Data at No Extra Cost



RYERSON CERTIFIED STEELS

HEAT ANALYSIS AND CARBURIZING DATA SHEET

The data on this chart refers only to steel from the particular heat indicated. Be sure the heat symbol letters shown on this sheet are the same as the letters on the alloy steel delivered to you.

S. A. E. Type 4615-20

RYERSON CERTIFIED STEELS

HEAT ANALYSIS AND HEAT TREATMENT RESULT CHART

The data on this chart refers only to steel from the particular heat indicated. Be sure the heat symbol letters shown on this sheet are the same as the letters on the alloy steel delivered to you.

Heat Symbol

S. A. E. Type 3130-40

HEAT ANALYSIS

C .38 Mn .78 Phos. .018 S .021 Si .23 Ni 1.35 Cr .69 Mo Va

Inherent Grain Size 6-7 Inclusions (Automotive Classification): Oxides 4 Silicates 3

HEAT TREATING CHARACTERISTICS

1" round quenched in Oil at 1525 °F. Drawn as shown below.

Tensile Strength

Yield Point

Brinell

% Reduction

% Elongation

This sheet shows actual analysis reported by the mill on heat indicated by symbol letters. It also shows physical properties developed by heat treatment tests on one inch round samples taken from this heat. The data shown will vary from one part of the heat to another due to permissible segregation and normal variation of analysis determinations.

The information is given for the guidance of our customers in determining the best heat treatment for this steel, but it will not be accepted as a basis for rejection of material nor establishment of claims. Do not neglect to consider effect of mass on the results developed by heat treatment. Further information on this subject is included in the Ryerson General Data Book.

JOSEPH T. RYERSON & SON, INC.

CHICAGO MILWAUKEE ST. LOUIS CINCINNATI DETROIT CLEVELAND BUFFALO BOSTON PHILADELPHIA JERSEY CITY

Now you can be sure . . .

You can depend on better results in less time when your heat treater is guided by the Ryerson alloy data charts. These charts show him the exact properties of the steel with which he is working and show him how to get the desired results. He does not have to test. He takes no chances. Spoilage is eliminated and a sound dependable job of high accuracy and uniformity is assured.

In addition to saving in production costs, the Ryerson Certified Alloy Plan benefits the Purchasing Department, as they can keep a detailed record of the exact analysis of every alloy purchased. Thus it is possible to duplicate particularly desirable close range specifications on repeat orders.

The Metallurgical Department is benefitted for they can call for any reasonable physical requirement and be sure the Heat Treater can produce the required properties.

Ryerson Certified Steels also include carbon, tool and stainless steels that meet definite quality standards. They offer many advantages to steel users. Let us send you a booklet which tells the complete story.

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Special Ryerson Data Sheets

While two heats of an alloy steel may be almost identical in chemical analysis, one may be much more responsive to heat treatment. For this reason, Ryerson data sheets show *actual* heat treatment results.

Two types of data sheets are used, one for the carburizing steels which gives complete analysis and the results of carburizing tests. The other, which is for the higher carbon steels, shows actual quenching and drawing results. Both charts are accurate guides that help the heat treater save time in securing desired properties.

RYERSON *Certified* STEELS

Stainless Broadens Its *Food Service* Equipment Market

Eye appeal, cleaning ease, durability make bright steel favorite in restaurants, hotels, clubs, bakeries—They use 4500 tons annually

■ CONSERVATIVE estimates place at 4500 tons the annual consumption of stainless steel in restaurant, hotel, bakery and club equipment. These establishments were among the first to adopt the bright metal on a large scale, and by 1931, the food and associated industries were the No. 1 consumers.

Now surpassed by the automotive industry in tonnage consumption, stainless nevertheless continues to broaden its market in places where food is prepared and served. Stainless, of course, has no monopoly and substantial tonnages of galvanized, black and enameling sheets, as well as other metals also are used.

While modern hotels and restaurants are profusely equipped with stainless, the market is far from saturation, say sales engineers. New establishments will lean heavily on the nickel-chromium alloy for kitchen equipment and serviceware; the replacement market will be constant; and despite the wide acceptance already gained, new applications are being developed and portend a greater outlet.

Hotel and restaurant equipment is fabricated by at least 587 manufacturers. This group also furnishes equipment to clubs and similar institutions. About 60 per cent build hospital equipment, and many fabricate bakery machinery.

In STEEL'S survey of this field, some fabricators said they recently have received inquiries from customers contemplating all-stainless construction in items now fabricated from other materials. Practically all commented on a "strong trend" toward more stainless, pointed out its essential characteristics—beauty, strength, durability, cleanability, corrosion and heat resistance.

Greater Markets and Profits

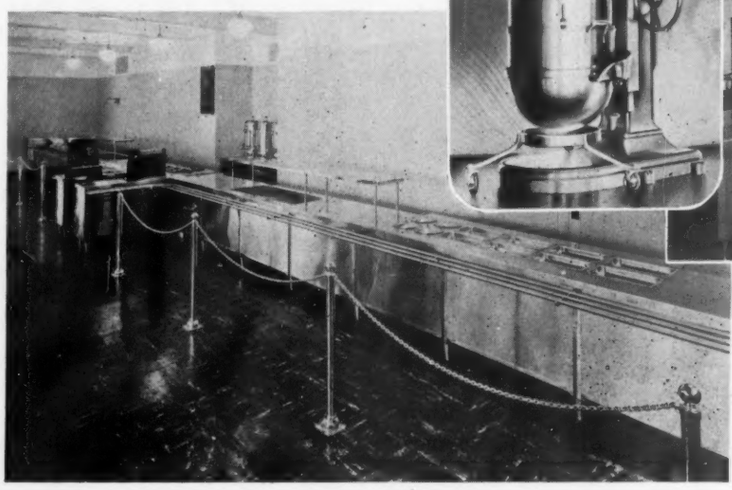
For some, stainless has meant commercial salvation, has been responsible for increased business, wider markets and greater profits.

Aside from stainless' essential advantages, perhaps the most important spur to its greater use has been the development of knowledge in its fabrication. New welding processes have permitted designs which formerly were impossible. Modern welds are made so quickly that there is not enough heat generated to cause loss of strength in the metal.

Welding is the usual method of fabricating, having replaced lock seaming and soldering, which were practiced several years ago.

Coloring of stainless steel presents some interesting possibilities and probably will play an important part in the industry's future. It lends manifold possibilities in furniture trim, in flat and hollow ware for table service and in other institutional applications. Coloring, however, probably will be more important in architectural and transportation applications. The natural finish is considered almost ideal for most hotel and restaurant uses.

How great a market is offered by



■ **Fifteen thousand dollars worth of stainless went to equip the industrial plant cafeteria at left. University of Michigan's law club adopted Armco stainless for its cafeteria and service equipment, above. Inset shows a modern all-stainless mixer. Photos courtesy, American Rolling Mill Co., Middletown, O.; Republic Steel Corp., Cleveland; and Hobart Mfg. Co., Troy, O.**

these establishments is outlined in a survey of their number and annual steel equipment purchases.

A restaurant census reveals 251,473 in the United States. Most are small, only about 20,000 doing a yearly volume exceeding $20,000. Their steel purchases, largely sheets for kitchen equipment and serviceware, total nearly $40,000,000 a year. The approximate breakdown:

Kitchen equipment	$26,424,000
Refrigeration	4,900,000
Tableware	1,300,000
Furniture and sinks	2,800,000
Air conditioning	3,000,000
Maintenance	500,000
TOTAL	$38,924,000

Stainless steel is used for cooking purposes, steam tables and steam table insets, counters and shelving, sinks, individual coffee pots and the large coffee makers, cream dispensers and ice cream cabinets, dishwashers, and a wide variety of containers. Stainless flatware also is popular.

A finish similar to the No. 4 standard polish usually is applied, although the No. 6 satin finish and the No. 7 or No. 8 mirror finishes often are used for contrast.

In the United States and Canada are 28,795 hotels, representing an investment of $5,000,000,000. Many generate their own electricity and operate their own heating and air conditioning plants. They spend approximately $27,000,000 annually for steel equipment:

Kitchen equipment	$8,900,000
Refrigeration	1,250,000
Tableware	1,400,000
Plumbing goods	8,900,000
Lighting fixtures	2,320,000
Furniture	2,312,500
Air conditioning	1,750,000
Maintenance	250,000
TOTAL	$27,082,500

Stainless shares in hotel equipment much as in restaurant equipment. Room service units usually are stainless. Generally hotel service is more luxurious than that in the average restaurant and this is reflected in the greater use of stainless covers to keep food warm, and in a greater profusion of flat and hollow ware.

■ **Bakery and restaurant fronts often are dressed up in stainless. Here it is used for sign, molding, and bands on window glass**

Most recent census of commercial bakeries lists 17,714 establishments, employing 183,000 wage earners, and making a product valued at well in excess of a billion dollars a year.

Trend in per capita bakery bread consumption indicates a greater dependence on commercial bakery products, less on home-made goods. Thirty per cent fewer bakeries now produce 2½ times as much bread as in 1914. As mass production entered the baking industry, the need for improved machinery developed.

Stainless applications include oven linings, dough mixing equipment, doughnut machinery, baking pans, conveyors and table tops, slicers, wrappers, and miscellaneous equipment. The 18-8 grade usually is preferred. A test made by the national bureau of standards a number of years ago indicated that for oven linings this analysis was superior to other grades. Many bakeries use

■ **Kitchens in the New York Central's Twentieth Century, left, and in the NIEUW AMSTERDAM, right, a Dutch ship, are finished in Enduro, Republic Steel's stainless**

stainless liberally for store fronts and interior trim.

Consumption figures for stainless steel in commercial bakery equipment are not available, but producers estimate it at several hundreds of tons yearly.

Incidentally the baking industry operates 85,000 trucks, some of which are covered with stainless.

The 7300 private clubs—golf, city, yacht, beach, polo—spend approximately $10,000,000 for steel equipment. Half is for kitchen equipment; the remainder for bar trim and gadgets, tableware, plumbing, furniture and refrigeration.

Because articles purchased by these organizations reflect the desires of the wealthiest and most influential group in a community, clubs bear added consideration from an educational angle—particularly for stainless.

$100,000,000 Annual Market

America's 6189 hospitals spend about $6,000,000 a year for kitchen equipment and another half million for tableware and refrigeration, in addition to $127,500,000 for medical and surgical equipment (STEEL, Nov. 7, p. 17).

Other types of institutions, jails, asylums, and various homes, have been estimated to spend more than $10,000,000 annually for steel equipment.

This survey indicates a market for steel equipment, excluding hospital medical and surgical equipment and bakery trucks, in excess of $100,000,000 annually. Expenditures, of course, will vary considerably from year to year.

There is little standardization of prices as much of the equipment is built to specification. It is largely a quality market and specialty materials, such as stainless, have much to offer the consumer.

In addition, foreign hotels and restaurateurs are evincing an interest in equipment made of American stainless and some sizable exports have been made.

Armco To Build Garden Village of 60 Steel Houses

■ American Rolling Mill Co. will start work in the spring on "a garden village of 60 steel homes" three miles south of Middletown, O.

The objective was described as "an economically-priced community of small homesteads in the country, where men working in the steel plant could reduce the cost of living by devoting their spare time to gardening."

The homes, situated on acre tracts of tested garden land, will cost $4500 to $5300 each.

Bethlehem's 1938 Profit 16.5% of 1937; Hourly Pay Average, 91.2 Cts.

■ BETHLEHEM STEEL CORP., first of the large steel companies to report its fourth quarter earnings, had a net profit of $3,658,160 in that period, compared with $446,866 in the third quarter, and $4,253,329 in the fourth quarter of 1937.

For the year 1938 the company's profit was $5,250,239, compared with $31,819,596 for 1937. Despite this relatively poor showing, a dividend of $1.75 was declared on the 7 per cent cumulative preferred stock, and 25 cents a share on 5 per cent cumulative preferred, in each quarter of 1938. The fourth quarter net was equal to 56 cents per common share.

In announcing the report, E. G. Grace, president, commented on the fact the company now is operating at 51 per cent, while incoming business is at a rate of 46 per cent, the difference representing replenishment of inventories. He estimated the company's rate of ingot production for the current quarter will be about 50 per cent, which would compare with 56.5 per cent in the fourth quarter; 43.3 per cent for all of 1938, and 77.7 per cent for 1937.

Price Stability Increasing

Steel prices throughout the industry, he said, have been gradually increasing in stability since last October. He added that "there never will be complete stability"—this with reference to extras—but thought there was no fundamental weakness in quotations at present.

He went on record as saying the sharp break in sheet prices last October was in no way attributable to the smaller steel companies, but was due directly to the larger, fully integrated producers. Bethlehem, he said, had practically completed by the end of the quarter the rolling of sheets and strip booked at the time of the price reduction.

Unfilled orders Dec. 31 amounted to $162,774,713, a new peace-time record. The difference of more than $60,000,000 over the total at the end of the preceding quarter was due in a large measure to a contract for the construction of a battleship for the government, involving approximately $50,000,000.

Questioned concerning armament, he stated Bethlehem had no such work except for the United States government, but this had been sufficient to keep its armor plate shops busy for the past two years, and active operations are in sight for three or four more years. There are three large armor plate makers, and he was confident they have been and will continue equally as active, in point of percentage operations.

Determination by the department of labor of a 62½-cent minimum wage for eastern steel mills engaged in government work under the Walsh-Healey act was not a case "of rate finding as designed under the law, but of rate fixing," he declared. "A 62½-cent rate in the East is patently not in accordance with the prevailing wage."

The minimum rate being paid in the East, and a rate which his company has maintained for common labor is 56½ cents, while labor in some lines of similar work receive less. For many years there has been a wage differential in the East, under Pittsburgh. According to the department's schedule, the East takes in practically all of the territory east of the Mississippi river and north of the Mason and Dixon line. (STEEL, Jan. 23, p. 15).

Must Meet Southern Competition

He pointed out that while Bethlehem's largest production unit, Sparrows Point, normally employing 20,000 to 25,000 men, has been paying 56½ cents minimum, it is just outside of Baltimore and its principal competition comes from southern mills, which have been and need continue to pay only 45 cents.

He cited common wage rates in all localities where Bethlehem's leading units are situated, indicating his company has been paying a minimum equivalent at least to the highest prevailing minimum.

Asked how the rates might affect men in the higher brackets, he said he thought there would have to be some adjustments. Theoretically, such higher minimum rates would apply only to employes directly engaged on government work, but how that theory would work out in actual practice was "another thing."

He remarked that Bethlehem employes averaged 91.2 cents an hour in 1938, against 89.1 cents in 1937.

DIVIDENDS DECLARED

Baldwin Locomotive Co., Philadelphia, declared the regular semi-annual dividend of $1.05 a share on the 7 per cent preferred stock, payable March 1 to record of Feb. 18. The board also voted to pay coupons due March 1, 1939 on refunding mortage bonds 6 per cent convertible series due 1950, in preferred stock in lieu of cash.

♦

Copperweld Steel Co., Glassport, Pa., has declared a dividend of 40

cents a share on the 300,000 shares of $10 par value capital stock, payable March 10 to record March 1. The directors also approved a 2-for-1 split-up increasing outstanding shares to 600,000. If conversion of the old stock for the new is completed by March 1 the dividend will be 20 cents on the new stock. The company paid a dividend of 50 cents March 10, 1938, and dividends of 30 cents each on June 10, Sept. 10 and Dec. 10.

♦

M. A. Hanna Co., Cleveland, declared the regular quarterly dividend of $1.25 a share on the $5 cumulative preferred stock, payable March 1 to record of Feb. 15.

♦

International Business Machines Corp., New York, declared a regular quarterly dividend of $1.50 a share on capital stock, payable April 10 to record of April 1.

♦

A. M. Castle & Co., Chicago, declared a quarterly dividend of 25 cents a share on common stock, payable Feb. 10 to record of Feb. 3. The same amount was paid Nov. 10.

♦

U. S. Pipe & Foundry Co., East Burlington, N. J., declared four regular quarterly dividends of 50 cents a share on common stock, payable quarterly beginning March 20. Net profit for the year ended Dec. 31 was $1,654,238, equal to $2.38 a common share, against net profit of $2,235,756 or $3.21 a share in 1937.

♦

Ingersoll-Rand Co., New York, declared a dividend of $1 a share on common stock, payable March 1 to record of Feb. 6. Payments last year were $1.50 March 1, $1 June 1, $1.50 Sept. 1 and $1.50 Dec. 1.

BROKERS' HOLDINGS IN U. S. STEEL HIGHER

■ United States Steel Corp. common shares outstanding Dec. 31, 1938, totaled 8,703,252; preferred shares outstanding were 3,602,811. Of the common stock outstanding, 2,166,473 shares, or 24.89 per cent, were in brokers' names, representing an increase of 108,235 shares over the amount held by brokers Sept. 30. Investors' common holdings Dec. 31 were 6,536,779 shares, or 75.11 per cent, compared with 76.35 per cent on Sept. 30.

Brokers held 10.94 per cent preferred stock on Dec. 31, compared with 10.70 per cent Sept. 30. Investors' holdings were 3,208,552 shares, or 89.06 per cent, against 89.30 per cent Sept. 30.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Jan. 28	Change	Same week 1938	Same week 1937
Pittsburgh ..	46	+ 4	30	81
Chicago	45.5	— 2.5	27	78
Eastern Pa...	34	None	31	53
Youngstown..	45	— 7	27	77
Wheeling	64	None	46	41
Cleveland ...	60	+ 1	31	76
Buffalo	44	None	18.5	86
Birmingham..	77	None	60	76.5
New England.	70	None	20	83
Cincinnati ...	52	— 3	40	21
St. Louis.....	40	None	21	80
Detroit	88	None	52	90
Average....	51.5	None	33	76

Sees Plant Union Sentiment Growing

■ Vigorous support for proposed amendments to the national labor relations act was urged by Col. William Frew Long, general manager, Associated Industries of Cleveland, before that group's nineteenth annual meeting Jan. 25.

"Everywhere it is being realized that the act, whose main purpose was to prevent strikes, has become notable for the labor conflicts it has encouraged," he declared.

Criticizing the "maladministration" by the labor board and the policies of the unions it has encouraged, Colonel Long said there would be a large increase in independent unions were they given a fair break by the board. Current trend in union sentiment among workmen is disclosed by the fact that during 1938 independent unions won 62 per cent of the labor board elections in which they participated, he said.

Elected to three-year terms on the association's board were: P. E. Bliss, president, Warner & Swasey Co.; Frank H. Clark Sr., chairman, Elipse Electrotype & Engraving Co.; Clarence L. Collens, president, Reliance Electric & Engineering Co.; F. C. Crawford, president, Thompson Products Inc.; Franklin G. Smith, president, Osborn Mfg. Co.

First Compressed Air Safety Code Approved

■ First safety code for compressed air machinery and equipment has been approved by American Standards association, New York. It is being published in a nine-page booklet by American Society of Mechanical Engineers, New York.

It includes specific recommendations for construction and use of compressors, tanks, pipe lines and other equipment, with separate sections on receivers and utilization devices. Two departments of the federal government and 19 national organizations participated in its development, under leadership of the American Society of Mechanical Engineers and American Society of Safety Engineers. The code may be obtained for 30 cents from the Society of Mechanical Engineers or American Standards association.

PRODUCTION

■ STEELWORKS operations last week rose in two districts, declined in three and were stationary in seven. The national rate is estimated at 51.5 per cent, unchanged from the preceding week.

Youngstown, O.—Receded 7 points to 45 per cent. The week started at 47 per cent and closed at 42. This is expected to be the level this week.

Chicago—Curtailment by an important producer was chief cause of the rate receding 2.5 points to 45.5 per cent. Three mills are operating at about 70 per cent, higher than at any time in 1938; two others at about half that figure, lowest since last midyear.

St. Louis—Unchanged at 40 per cent for third consecutive week, with 13 open hearths in service.

Cincinnati—Down 3 points to 42 per cent with a further recession indicated for this week, due to uneven schedules of one producer.

Birmingham, Ala.—Steady at 77 per cent, with 17 open hearths active. This rate has prevailed since the final week of December.

Pittsburgh—Increased 4 points to 46 per cent.

Wheeling—Major producers operated at capacity and the rate held at 64 per cent.

Detroit—With 22 of 25 open hearths active the rate was unchanged at 88 per cent.

Buffalo—Steady at 44 per cent for the fourth consecutive week, the same schedule expected this week.

New England—Continued at 70 per cent for the third week, with no change indicated.

Central eastern seaboard—For the fourth week production held at 34 per cent.

Cleveland—Rose 1 point to 60 per cent. Further gain may develop.

Bar Iron Wages Steady

■ Monthly examination of bar prices by representatives of the Western Bar Iron association and Amalgamated Association of Iron, Steel and Tin Workers, last week developed unchanged card rates for February. On boiling, bar and 12-inch mills the rate is 2.25 cents; on guide and 10-inch mills, 2.35 cents. These rates have remained unchanged since last July.

Twenty-five Per Cent Gain in Tin Plate Forecast at Canners' Meeting

■ PRESENT signs for business in general are encouraging, declared B. F. Fairless, president, United States Steel Corp., before the thirty-second annual convention of the National Canners association, Canning Machinery and Supplies association, and National Food Brokers association, Chicago, Jan. 22-27. Between 10,000 and 15,000 attended.

Demand for tin plate generally this year will be approximately 25 per cent larger than in 1938, according to steel men who attended.

"Given a fair chance to express themselves, the constructive forces at work in our national economy should outweigh the unfavorable factors, and thus determine our nearby future course," said Mr. Fairless.

He characterized the will to improve as the strongest motive which actuates business enterprise and stressed the important part played by the co-operative effort of related industries in the upbuilding of any large and essential industry.

As an example, he cited the interrelationship of scientific and technical progress in the canning, canmaking and steel industries.

"We look at the outstanding progress that has been made, year after year, in the technique of processing and packing, and marvel at the results confronting us today. The consumer acceptance which has followed that progress is a fair measure of its practical value. Wide markets and goodwill have been built up by the assurance of high quality, astonishing variety, overall convenience, and value received in return for the moderate prices paid."

Rapid growth and diversification of uses for tin plate in the canmaking and packing industries, Mr. Fairless said, has furnished strong incentives for progress in steel.

Rouses Public Interest

Public attention has been attracted more extensively by the continuous hot and cold reduction mills than by the other measures taken for improvement by tin plate makers, he said, because the equipment itself is unusually large and powerful, operating speeds are rapid and the process embodies numerous features which appeal to the imagination. Tin plate manufacturers and buyers are most interested in results.

Mr. Fairless noted that present continuous mill capacity in the United States is more than 2,000,000 net tons of cold reduced tin mill products per year.

"Such outstanding developments as are witnessed in America are feasible here because of the concomitant development of the canmaking and can-using industries."

As an illustration of the steel industry's part in the continual progress made by the canning industry, Mr. Fairless said: "Last year for example, the steel industry spent more than $175,000,000 and in 1937 approximately $260,000,000 on the items just mentioned. One does not separate steel and tin plate in considerations of this kind because they are essentially parts of the same organism. You may be assured, however, that a very large proportion of the money represented by the figures quoted were applied, in those years, to the installation of processes and equipment having to do with the production of tin plate.

A dinner consisting entirely of canned foods was sponsored by Weirton Steel Co. at Chicago Athletic club, with 150 key men in the tin plate consuming industry as guests.

Heating and Ventilating Society Elects Officers

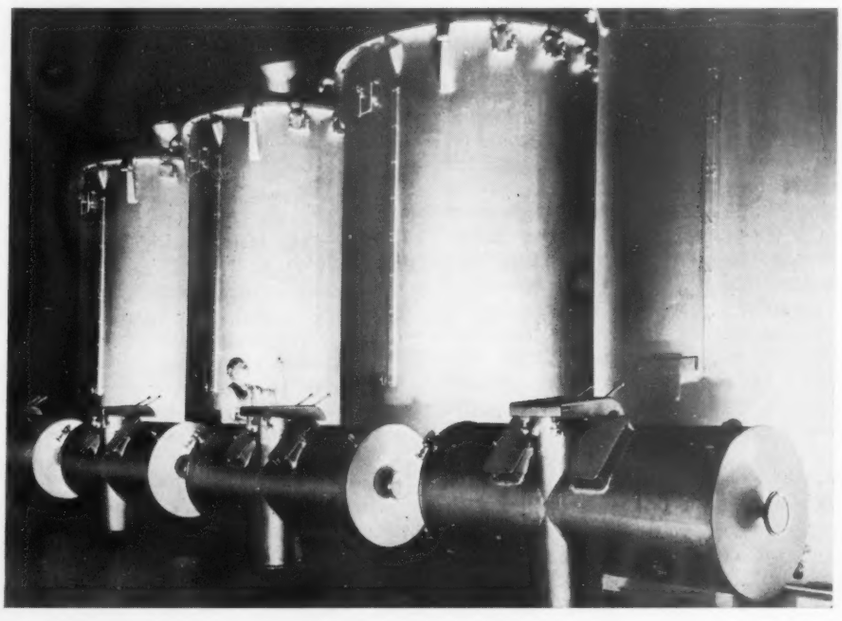
■ J. F. McIntire, vice president, United States Radiator Corp., was elected president, American Society of Heating and Ventilating Engineers, at the society's forty-fifth annual convention at the William Penn hotel, Pittsburgh, Jan. 23-26.

Other officers elected were: First vice president, F. E. Giesecke, director, Texas Engineering Experiment Station, College Station, Tex.; second vice president, W. L. Fleisher, consulting engineer, New York; treasurer, M. F. Blankin, president, Haynes Selling Co., Philadelphia; secretary, C. V. Hutchinson; and technical secretary, C. V. James, both the latter being located in the society's headquarters, 29 West Thirty-ninth street, New York.

Chosen for three-year terms on the executive committee were: E. K. Campbell, president, E. K. Campbell Heating Co., New York; A. J. Offner, consulting engineer, New York; and G. L. Tuve, professor of mechanical engineering, Case School of Applied Science, Cleveland.

Approximately 525 attended convention sessions which were devoted to such subjects as heat transfer, fuels, physicological factors, design factors and air pollution.

Welded Tanks Withstand High Vacuum



■ These four 15,000-kilovolt-ampere transformers have welded tanks of copper-bearing steel. A channel welded over the inside of each butt welded seam permits testing the butt welds with air under high pressure. Tanks are designed to withstand a vacuum at 28 inches which permits evacuating all air when insulating oil is inserted. Allis-Chalmers Mfg. Co., Milwaukee, built these units to step up power from 14,000 to 145,000 volts. Each weighs 117,000 pounds, is 21 feet high

"What Industrial Advertising Means To a Machine Tool Builder"

By WENDELL E. WHIPP

President, Monarch Machine Tool Co., and National Machine Tool Builders' association

■ THERE are a very few subjects on which you are likely to find so many self-qualified experts as advertising. Most of us are like the lady at the art museum who said: "I don't know anything about art, but I know what I like!"

Certainly that is one good reason why life isn't always too comfortable and rosy for you fellows who are in and of the industrial advertising brotherhood. Moreover, it is the best reason I can think of why I, myself, should presume to address you on your own subject.

But I have another reason also . . . I am often called up to approve advertising budgets and to pass on matters of advertising policy. And I want to assure you that no one can do that long without either getting a lot of faith in advertising or deciding to soft pedal it, or abandon it altogether.

The fact that we, in my own company, are investing more and more money in advertising, year after year, in season and out of season, in good times and bad, *is proof* that we have faith in industrial advertising. In that respect, I feel like the man who replied when he was told that advertising never put any hay in the barn, "Well, that's right; but neither did the sun!"

But there is one subject on which I am reasonably well informed; and that is the subject of machine tools. To me, machine tools not only mean my own livelihood and most absorbing personal interest; they mean American industry and individual initiative and the modern way of living.

Mastertools of Industry

Machine tools are the mastertools of industry. They are the only machines I know that reproduce themselves. By the same token, they are used to produce other kinds of machinery. . . for the manufacture of the products and performance of services which make possible the American standard of living!

You all know about Eli Whitney; and doubtless think of him as the inventor of the cotton gin. But his most important contribution to our times was the principle of *the interchangeability of parts* . . . which is the foundation principle of mass production. He stated that his main objective was to make the same parts of a product assembly "as much alike as the successive impressions of a copper-plate engraving."

I don't need to tell you that he was successful and that this principle has been the basis on which most products in common use today have been brought within practical reach of millions.

Underlying Significance

All of you, who live and work in one of the world's major machine tool centers, know that there is a great deal to be said about the underlying significance of the machine tool industry. Much of it is being said very well indeed by the National Machine Tool Builders' association.

I have so far ventured to dwell on this subject of machine tools, because to me, they are a symbol of industry itself and, as such, can also be construed as a *SYMBOL OF INDUSTRIAL SALES AND ADVERTISING.*

I think no industrial advertising man who is worth his salt will deny that once you set a successful pattern for industrial selling, you have discovered much that you need to know to produce successful industrial advertising.

Up until about the time of the World war, machine tools were sold on a "demand basis," by engineers who could demonstrate and handle blue prints and let their customers take the machines away from them. But it doesn't happen that way any more; and in the meantime, many industrial concerns — including a goodly number in the machine tool industry—have changed their selling methods. They have discovered a newer and more successful pattern for selling industrial products and equipment, a pattern that even today could well be more generally applied.

Briefly, this pattern can be described as that of sales application engineering. It is the pattern used by salesmen who know that they must sell objectively; who study the customer's requirements, his production problems and his need for cost reducing methods and devices, and then proceed to sell their equipment on the basis of *applications* engineered to meet that need. This applies primarily, of course, to production equipment as distinguished from tool room or standby equipment. But even in the latter case, the idea of application engineering holds good in terms of services that need to be rendered.

The best salesman who calls on us, for example, is a man who never comes in without a plan in his mind. . . . He has won our complete confidence. . . . He sells the profit his equipment can earn; rather than just another machine. That man sells not gadgets or features or tricks or price, but ideas for doing a better job and for reducing costs. That is *sales application engineering.*

Now if you happen to be enlisted among those who believe in the close relationship between advertising and selling, you will agree that here is a selling pattern that can be successfully followed also in industrial advertising. Following that pattern, to be sure, represents a radical departure from the old method of advertising merely by means of ballyhooing products and features. It is a pattern that recognizes the importance of advertising what is likely to interest the prospect.

Such advertising deals, not so much with the product itself, as with its uses and applications; not so much with generalizations, as with specific cases in which the product actually did a job for some one else who had a common problem on his hands. It deals with the advertiser's facilities for rendering assistance to the customer in the analysis and definition of his actual operating requirements. It speaks in the language of accomplishment, rather than in that of claims and promises.

Buyers All from Missouri

I am aware, however, that advertising like that seems hard to achieve because we are so prone to follow the calf-path of habit. We are too close to the products we make and the services we render. We are proud of our development and manufacturing accomplishments. We are too subjective in our reactions to our own place in the sun. We want to tell the world about it, and forget that the world we sell is from Missouri and has to be shown.

But really, it isn't so difficult to demonstrate the merit of our products by means of applications, even in advertising. It is only difficult if

(*Please turn to Page* 88)

Address by Mr. Whipp before the Cincinnati Association of Industrial Marketers, Cincinnati, Jan. 17.

Year's Exports 62% of 1937

■ IRON and steel exports in 1938, exclusive of scrap, totaled 2,149,184 gross tons valued at $139,667,141. This tonnage was only 62 per cent of the 3,475,257 tons, valued at $222,849,821, in 1937, according to the metals and minerals division, commerce department.

Despite this shrinkage 1938 exports exceeded any other year since 1929, except 1937, and were greater than the combined export trade of 1932, 1933 and 1934.

Although its shipments declined from 879,652 tons in 1937 to 484,879 tons in 1938, Japan continued the largest market for American goods. Canada's purchases were second at 276,337 tons, and the United Kingdom third with 132,618 tons.

Pig iron was the leading export commodity, 432,851 tons, compared with 782,436 tons in 1937, an all-time record for that material.

December exports were 166,404 tons, valued at $11,506,216, 29,752 tons less than in November. In December, 1937, exports were 306,637 tons valued at $20,720,150.

Japan was the leading market in December with 30,075 tons, Canada second with 23,320 tons.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Dec. 1938	Nov. 1938	Jan. thru Dec.'38
Pig iron	20,622	38,383	432,851
Ferromanganese and spiegeleisen	3	8	244
Other ferroalloys	149	43	1,192
Ingots, blooms, etc:			
Not containing alloy	10,197	3,101	159,930
Alloy incl. stainless	198	323	7,736
Steel bars, cold fin.	1,134	693	13,378
Bars, iron	37	42	1,354
Bars, concrete	1,699	2,063	21,670
Other steel bars:			
Not containing alloy	8,431	8,215	106,732
Stainless steel	117	5	669
Alloy, not stainless	2,393	1,622	7,932
Welding rods, electric	134	118	1,181
Wire rods	307	1,600	22,283
Boiler plate	348	103	6,740
Other plates, not fab.:			
Not containing alloy	19,926	20,961	192,011
Stainless steel	17	8	277
Alloy, not stainless	58	784	3,034
Skelp iron or steel	7,439	24,706	59,686
Sheets, galv. iron	229	395	3,691
Sheets, galv. steel	7,279	5,910	72,269
Sheets, "black" steel:			
Not containing alloy	23,428	21,984	200,213
Stainless steel	60	60	1,681
Alloy, not stainless	150	34	3,364
Sheets, black iron	866	406	7,561
Strip steel, cold-rolled:			
Not containing alloy	2,335	2,116	24,763
Stainless steel	62	58	479
Alloy, not stainless	31	33	342
Strip steel, hot-rolled:			
Not containing alloy	4,355	3,638	36,716
Stainless steel	.....	25	153
Alloy, not stainless	24	7	108
Tin plate, taggers' tin	10,578	10,908	157,069
Terne plate	307	341	4,397
Tanks, except lined	2,228	1,714	37,623
Shapes, not fabricated	5,733	6,916	83,217
Shapes, fabricated	2,712	3,227	37,523
Plates, fabricated	99	77	21,757
Metal lath	76	60	858
Frames and sashes	113	171	1,414
Sheet piling	104	526	3,494
Rails, 60 lbs.	4,284	505	45,821
Rails, under 60 lbs.	116	105	4,390
Rails, relaying	599	3,739	32,412
Rail fastenings	385	564	7,328
Switches, frogs, crsgs.	45	92	1,645
Railroad spikes	223	223	2,614
R. R. bolts, nuts, etc.	148	150	1,236
Boiler tubes, seamless	328	425	10,765
Boiler tubes, welded	40	7	1,464
Pipe:			
Smls. casing oil-line	3,490	3,279	48,572
Do. welded	592	644	11,025
Smls. black, ex. cas'g	858	445	7,460
Pipe fittings:			
Mall. iron screwed	304	183	3,093
Cast iron screwed	138	155	1,891
Pipe and fittings for:			
Cast iron pressure	1,112	2,652	20,045
Cast iron soil	874	951	9,958
Pipe, welded:			
Black steel	1,025	821	10,758
Black wrought iron	192	137	3,024
Galvanized steel	2,143	1,540	14,638
Galv. wrought iron	640	307	2,768
Pipe and fittings:			
Riveted iron or steel	2	2	944
Wire:			
Plain iron or steel	2,075	2,163	24,014
Galvanized	2,532	3,718	25,849
Barbed	3,070	3,804	33,940
Woven wire fencing	248	150	2,208
Woven wire screen cloth:			
Insect	23	28	266
Other	88	82	1,067
Wire rope and cable	342	278	3,587
Wire strand	59	22	784
Card clothing	14	11	96
Other wire	726	818	6,167
Wire nails	2,599	2,122	20,720
Horseshoe nails	90	54	886
Tacks	25	21	264
Other nails, staples	188	467	4,095
Bolts, machine screws	749	665	8,057
Castings:			
Gray iron, semi-steel	335	474	3,918
Malleable iron	96	123	1,238
Steel, not alloy	74	74	1,303
Alloy incl. stainless	246	225	1,146
Car wheels, tires, axles	579	1,872	20,919
Horseshoes and calks	5	2	105
Forgings, n.e.s.:			
Not containing alloy	671	492	8,119
Alloy, incl. stainless	54	181	993
Total	166,404	196,156	2,149,184
*Scrap, iron and steel	321,261	271,422	2,979,006
*Scrap, tin plate	1,149	1,122	12,554
Tin plate circles, strips, cobbles, etc.	730	330	4,709
Waste-waste tin plate	551	566	7,254
*Total scrap	323,691	273,440	3,003,523
*GRAND TOTAL	490,095	469,596	5,152,707
Iron ore (gross tons)	8,762	33,389	570,611

*Corrected amounts for Nov. 1938 and Jan. thru Dec. 1938.

Machinery Exports Gain 12 Per Cent in 1938

■ Industrial machinery exports from the United States in 1938 were valued at $269,856,041 or 12 per cent more than the 1937 shipments, valued at $240,449,734, and only 3 per cent below the record of $277,764,507 made in 1929, according to the machinery division, bureau of foreign and domestic commerce.

Power-driven metalworking machinery was at record level, reaching the peak value of $97,270,616, a gain of 62 per cent over $59,880,376 in 1937.

Machinery shipments in December totaled $24,210,186, compared with $24,122,242 in December, 1937. Power-driven metalworking machines, at $9,873,371, gained 28 per cent over $7,720,824 in December, 1937. Other metalworking machinery declined 8 per cent, from $359,361 in December, 1937, to $330,815.

Foreign Farm Equipment Sales Above 1937 Total

■ Although exports of farm equipment declined 41 per cent to $3,935,694,612 for December, 1937, the 1938 shipments totaled $75,435,305, slightly above the $75,366,103 in 1937.

Harvesting machinery shipments were 53 per cent greater than in 1937. Tractors and parts totaled $51,420,976, a decline of 3 per cent from $52,893,276 in 1937. Seed separator exports were valued at $1,532,614, an increase of 37 per cent from $1,114,727 in 1937.

Cultivating implements dropped 11 per cent, from $9,304,598 in 1937 to $8,266,904. Miscellaneous farm machinery declined 19 per cent, from $5,777,030 in 1937 to $4,699,198.

Cleveland Chamber Will Oppose Waterway Project

■ Active opposition to the proposed Great Lakes-St. Lawrence waterway project has been voted by the Cleveland chamber of commerce, based on reports by its transportation, shippers', rivers and harbors, foreign trade and manufacturers' committees.

The association contends favor for the project has been created through misinformation, that transportation cost savings have been greatly exaggerated, and that many of the actual benefits would be to foreign, not American, interests. It claims the waterway would be detrimental to both inland manufacturers and labor because the Great Lakes area would be opened to cheap-labor competition. Iron ore, iron, steel and coal were cited as industries that would be affected adversely.

Norton, Carborundum in New Australian Company

■ Two leading American grinding wheel manufacturers are interested in a new Australian abrasives plant, Australian Abrasives Pty. Ltd. A factory building will be started within a month on a four-acre site at Sydney, New South Wales.

Interested in the new company are: Carborundum Co., Niagara Falls, N. Y.; Norton Co., Worcester, Mass.; Universal Grinding Wheel Co. Ltd., Stafford, England; and William McPherson of McPherson's Pty. Ltd., Australia.

Rapid expansion in Australia's metalworking industry in the past few years created a need for an abrasives manufacturing plant and caused Australian interests to seek co-operation by American and British manufacturers in establishing one.

MEN OF INDUSTRY

■ JOHN H. TOWNE, formerly secretary, Yale & Towne Mfg. Co., New York, has been elected chairman of the board of directors. He succeeds Walter C. Allen, who has resigned because of ill health. Fred Dunning, treasurer and assistant secretary, has been elected secretary, in addition to his position as treasurer.

♦

William P. Ewing, executive vice president, Superior Steel Corp., Pittsburgh, has been elected a director.

♦

John F. Baker, formerly with Surface Combustion Co., is now representing the Ajax Electric Co. Inc., Philadelphia, in the Pittsburgh district.

♦

John R. Heckman has been appointed midwestern representative for Electro-Alloys Co., Elyria, O., with headquarters at 122 South Michigan avenue, Chicago.

♦

W. H. Johnson, formerly purchasing agent, Climax Engineering Co., Clinton, Iowa, has been appointed purchasing agent, Foote Bros. Gear & Machine Corp., Chicago.

♦

John T. Wiseman, the past 18 years manager, Bethlehem Shipbuilding Corp. Ltd., Brooklyn, N. Y., yard, has been made general superintendent of the company's Quincy, Mass., yards.

♦

Louis J. Galbreath has been appointed technical advisor, New York district sales division, Revere Copper & Brass Inc. He formerly was head of Revere's product development department.

♦

Frank M. Urban, formerly assistant to W. T. Keenan, manager mechanical sales, Chicago branch, United States Rubber Co., New York, has been promoted to assistant manager, mechanical sales, Chicago.

♦

I. Lamont Hughes, former director and executive vice president, Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed secretary of highways in the cabinet of Gov. Arthur H. James of Pennsylvania.

♦

V. L. McEnnally, assistant treasurer, Detroit Steel Corp., Detroit, has been elected a director, succeeding C. P. Craine, resigned. Arthur A. Schrage, secretary, has been appointed to the additional post of vice president.

♦

V. H. Dieterich, of Chicago, has been elected a director, American Institute of Steel Construction Inc.,

Frank K. Chiles

New York, to serve until the next annual meeting of the institute. Mr. Dieterich is vice president in charge of operations, special order department, Joseph T. Ryerson & Son Inc., and has direct charge of the fabrication of structural steel.

♦

A. C. Dyer, since 1916 Pittsburgh district manager, Electric Controller & Mfg. Co., Cleveland, has been named general sales manager, with headquarters in Cleveland, effective March 1. Mr. Dyer has been an associate member, Association of Iron and Steel Engineers for more than 20 years, acting on various Pittsburgh committees.

♦

Arthur J. Williamson has been added to the technical staff of Summerill Tubing Co., Bridgeport, Pa., as metallurgical engineer in charge of research and development. Mr. Williamson's first commercial work was with J. G. Brill Co., Philadelphia, and during the past four years has been research metallurgist, John A. Roebling's Sons Co., Trenton, N. J.

Charles B. Bohn

President of the Bohn Aluminum & Brass Corp., Detroit, who has been elected president, Aluminum association, as noted in STEEL, Jan. 23, page 19

♦

Frank K. Chiles has been appointed assistant manager of sales in charge of bar division, Andrews Steel Co., Newport, Ky. Mr. Chiles at one time held positions with the former Carnegie Steel and Illinois Steel companies. Subsequently he became manager of sales, bar division, Corrigan, McKinney Steel Co., and after the company's merger with Republic Steel Corp. he was identified for some time with the latter's general sales organization.

♦

Robert W. Lea has resigned as president, West Virginia Coal & Coke Co., to become a vice president, Johns-Manville Corp., New York. He will be in charge of finance, taking over the position formerly held by Enders M. Voorhees, now chairman of the finance committee, United States Steel Corp. Mr. Lea will assume his new duties the latter part of March.

♦

John F. Malloy, Malloy & Schreiner, Philadelphia, has been elected president, Philadelphia chapter, Institute of Scrap Iron and Steel Inc. Thomas Bantivoglio, Camden Iron & Metal Co., Camden, N. J., has been elected vice president; Harry Stave, Stave Bros., Philadelphia, treasurer; Marcus J. Margulies, A. M. Wood & Co. Inc., Philadelphia, secretary.

♦

Oliver E. Mount has been elected treasurer, American Steel Foundries, Chicago. He will also continue as secretary. Mr. Mount joined the firm in August, 1916, as cashier at the then Chester, Pa., plant. Subsequently he became assistant auditor at that plant; works auditor, East St. Louis, Ill.; assistant treasurer; assistant secretary and assistant treasurer; secretary and assistant treasurer.

♦

A. M. Irvine, vice president in charge of coal sales, Dominion Steel & Coal Corp. Ltd., Montreal, Que., has retired, effective Jan. 31. O. P. Stensrud, heretofore assistant to vice president, has been appointed general manager of steel sales, and T. S. McLanders, superintendent of terminals, has become general manager of coal sales. Mr. Stensrud and Mr. McLanders have been associated with the organization a number of years.

♦

C. W. Heppenstall, since 1920 president and treasurer, Heppenstall Co., Pittsburgh, has become chairman of the board. R. B. Heppenstall,

heretofore vice president and general manager of sales, has been elected president. S. B. Heppenstall Jr., assistant manager in the sales department, succeeds R. B. Heppenstall. C. W. Heppenstall Jr., formerly general manager, has been made vice president in charge of operations. G. F. Ritenbaugh, secretary, has also been made treasurer.

♦

Karl A. Ostling, formerly in charge of industrial engineering, Pontiac division, General Motors Corp., has become vice president in charge of production, Carrier Corp., Syracuse, N. Y. Other changes in the corporation are the appointments of Edward T. Murphy, vice president in charge of the central district, to vice president in charge of marketing, and James A. Bentley, vice president, and head of International division, to vice president in charge of finance.

♦

E. A. Brown Jr. has been appointed superintendent, fuel department, Gary works, Carnegie-Illinois Steel Corp. He succeeds Vaclav Gregor, recently made assistant superintendent of steel production. Mr. Brown began his service with the corporation in 1911 as a tracer and detailer at its Homestead works, remaining there until 1937 when he was transferred to the Duquesne works as assistant to general superintendent.

E. A. Brown Jr.

♦

M. P. Lewis, formerly eastern district manager, wire sales, United States Rubber Co., New York, has been named assistant manager, wire sales department. H. H. Weber, since 1934 assistant manager, wire sales department, has become commercial engineer of that department. H. J. MacDonald, who has handled wire sales in the New England territory that past 18 years, succeeds Mr. Lewis as manager of wire sales, eastern district, which embraces the Boston, Philadelphia, New York, Pittsburgh, Detroit, Cleveland, Buffalo and Syracuse branches. He will continue his headquarters at the Boston office. Appointed to the post formerly held by Mr. MacDonald is C. W. Short, the past two years development manager at the Bristol, Conn., plant.

♦

H. E. Lewis, chairman and president, Jones & Laughlin Steel Corp., Pittsburgh, has been re-elected president, Pittsburgh Convention and Tourist bureau. Other officers are: Vice presidents, Joseph Dilworth, Westinghouse Electric & Mfg. Co., and Frank R. Phillips, president, Philadelphia Co.; executive committee, J. I. Alexander, Philadelphia Co.; J. Lester Perry, president, Carnegie-Illinois Steel Corp., and Edward O. Tabor, West Penn Power Co.

♦

H. G. Alexander has been elected chairman of the board, National Screw Mfg. Co., Cleveland. Mr. Alexander, who has served as president since 1929, succeeds D. C. Griese, who has retired but will remain a director. Herbert P. Ladds has been elected president, succeeding Mr. Alexander. Mr. Ladds, now president, Sweet's Steel Co., Williamsport, Pa., from which position he is resigning, will assume his new duties March 1. He has been with Sweet's Steel since October, 1937, prior to which he was with Lamson & Sessions Co. and Lake Erie Bolt & Nut Co.

Charles F. Newpher has been re-elected vice president in charge of sales and made a director. E. E. Griese has also been re-elected secretary-treasurer.

DIED:

■ DR. ALBERT SAUVEUR, 75, Gordon McKay professor of metallurgy emeritus at Harvard university, and a leading authority on metallurgy, in Boston Jan. 26.

He was born in Louvain, Belgium, June 21, 1863, of French parentage. He received his early education between 1881 and 1886 at the Athenee Royal, Brussels, and at the School of Mines, Liege. In 1889 he was granted an S. B. degree in mining and metallurgy by the Massachusetts Institute of Technology; in 1921, degree of Sc. D. by Case School of Applied Science, Cleveland; also the like honor by the University of Grenoble, France, in 1924, and in the following year by the University of San Marcos, Peru. Lehigh university in 1926 made him a doctor of engineering.

Dr. Sauveur served as chemist and metallurgist for various steel companies from 1889 to 1897, including Illinois Steel Co., at South Chicago. While there he began pioneer work in metallographic research with respect to heat treating. From 1897 to 1905 he was proprietor of the Boston Testing laboratories. He was instructor and assistant professor in metallurgy and metallography at Harvard university from 1900 to 1905, when he was made full professor. He was active in many technical and scientific societies.

Dr. Albert Sauveur

♦

John M. Lockhart, 73, chairman, Lockhart Iron & Steel Co., Pittsburgh, about 25 years, in that city, Jan. 23. He was also a director, Alpha Portland Cement Co., Easton Pa.; Westinghouse Air Brake Co., Wilmerding, Pa.

♦

Charles G. Taylor, 65, purchasing agent, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., until his retirement in 1935, at his home in Miami Beach, Fla., Jan. 10. He had been with Westinghouse 48 years.

♦

C. Wood Walter, who retired in 1925 as vice president, Cincinnati Milling Machine Co., Cincinnati, at his home in that city, Jan. 16. He had served as vice president, director, and chairman of the traffic committee, National Machine Tool Builders association.

♦

Richard Brinsley Sheridan, 66, former president, Brown Hoisting & Conveying Machinery Co., Cleveland, in Ossining, N. Y., Jan. 21. He first served the Brown company as representative in Russia, later for all of Europe. Returning to Cleveland in 1906, he was made general manager and subsequently became president. In later years he became an officer of Allied Machinery Co., American International Corp., and New York Air Brake Co., all of New York. He retired ten years ago.

New Equipment Scheduled in Plans For Aircraft Plant Expansions

■ NEW CAPITAL is flowing into the aircraft industry to finance expansion programs.

Largest recent offering was 40,000 shares of Bell Aircraft Corp., Buffalo. Proceeds of $1,240,000 will go into working capital, with about $250,000 allotted for machinery and equipment purchases.

Howard Aircraft Corp., Chicago, has arranged a $1,000,000 issue to enable immediate enlargement of its factory. The company will now add large commercial craft to its line of small planes.

Bellanca Aircraft Corp., New Castle, Del., registered with SEC its intention to sell common stock to realize at least $742,000. Funds will be used in plane development, expanding working capital and buying additional equipment for manufacturing metal aircraft.

Two plants at New Philadelphia and Dover, O., have been acquired by Zenith Aircraft Corp., New York, from Tuscar Metals Inc., and will be used for airplane and parts production. The amount involved is $780,000.

Contract for a new steel and glass-block factory building costing about $200,000 recently was let by Dart Mfg. Co., Sandusky, O., maker of aircraft parts and accessories.

American Helicopter Corp. has been formed in Toledo, O., as an affiliate of Willys-Overland Motors Inc., and is expected to manufacture low-priced autogyro planes. Willys-Overland plant facilities may be used. Howell French, president, was formerly sales promotion manager for Willys-Overland, and has been associated with the Fokker airplane interests.

Bruening-Winans Corp., Rochester, N. Y., was organized recently to manufacture aircraft parts, accessories and tools. Officers include W. H. Bruening, president; and W. R. R. Winans, vice president. Mr. Winans formerly headed Cunningham-Hall Aircraft Corp., Rochester.

See Greater Civil Output

Despite last year's general decline in civil aircraft sales, reports point to resumption of the uptrend in private and commercial plane production.

Piper Aircraft Corp., Lock Haven, Pa., notes a growing market for light sportplanes. The company built 737 such craft during 1938, its third successive record year.

Substantial impetus to buying of private airplanes in all types is considered certain should congress accept even partially the civil aeronautics authority's program to train 20,000 citizen flyers annually under national defense plans. At close of 1938 the nation had less than 23,000 licensed civilian pilots; and they alone were operating 11,159 aircraft.

President Roosevelt has recommended a $9,800,000 appropriation for the program's first year. Already underway is a $100,000 tryout which will train 330 students by June.

Although commercial air transport made a poor financial showing in 1938, traffic increased to a new peak. Scheduled lines carried nearly 1,500,000 passengers, 15 per cent more than in 1937. Air mail totaled about 23,000,000 pounds, against 20,114,000 the preceding year.

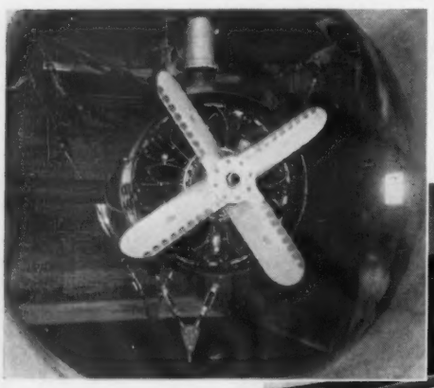
Present disposition of the CAA to boost mail rates offers promise for improvement in air carrier revenue, with a resultant gain in equipment purchases. Transcontinental & Western Air Inc., Kansas City, Mo., recently was awarded $740,000 in back mail pay and a $400,000 annual increase on its coast-to-coast route.

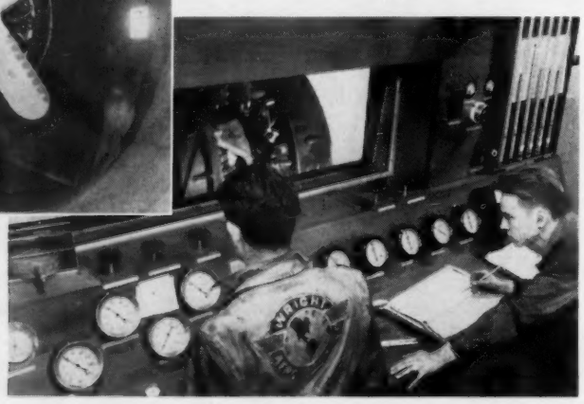
Pennsylvania - Central Airlines Corp., Pittsburgh, last week also applied for increased mail pay. If action is favorable, company proposes to spend $1,500,000 this year and next for 15 new transport craft, replacing its present fleet.

Transport plane builders are expecting some business from the companies making plans to open regular transatlantic passenger and mail service this year and in 1940. Included are: Pan American Airways Inc., New York; American Export Airlines Inc., New York; Britain's Imperial Airways; Germany's Lufthansa Line; and Air France Transatlantique.

Pan American has already ordered six Boeing flying boats designed for its projected Atlantic route. The $5,000,000 purchase will be partially financed with equipment trust certificates, first instance of their use by airlines.

That foreign demand for civil aircraft and accessories is far from being filled was disclosed lately by the department of commerce. In a bulletin it advised manufacturers to study the export markets.





■ Production of 3000-horsepower aircraft engines is seen by Wright Aeronautical Corp., Paterson, N. J., now building 14 test cells to accommodate such power plants. Most powerful today are 1500 horsepower. Engines mounted in these cells run 10 hours under flight conditions, are operated and checked from adjoining control room

River Shipments Increase

■ Tonnage of steel and other products shipped on the three rivers in the Pittsburgh district increased in December, according to the United States engineers.

STEEL PRODUCTS

Short tons

	Ohio	Monongahela	Allegheny
Dec., 1938...	140,700	83,400	4,800
Nov., 1938...	117,500	79,700	3,900
Dec., 1937...	67,875	49,675	450

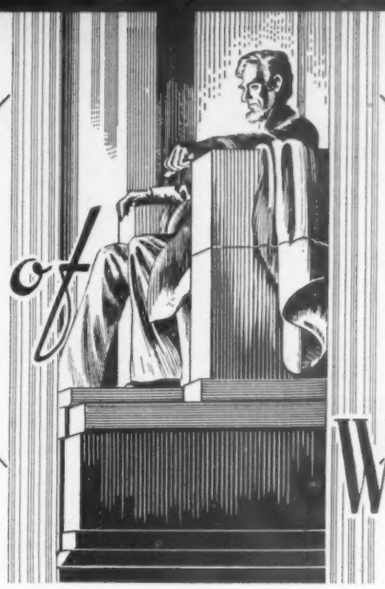
ALL PRODUCTS

Short tons

Dec., 1938..	1,074,400	1,797,500	180,050
Nov., 1938..	990,950	1,710,200	243,750
Dec., 1937..	706,674	1,239,407	125,620

■ Shipments of electric industrial trucks and tractors in 1938 were 842 units compared with 1844 units in 1937, according to the department of commerce. New orders totaled 684 units in 1938 against 1755 in 1937.

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ DATE for resumption of the monopoly hearings before the national economic committee has not yet been set but indications are they will be started again early in February. Insurance companies probably will be considered next. Last week the committee completed hearings on the patent situation.

That the President either has asked or will ask the committee to close its hearings soon was denied last week. This report had been current in Washington.

Hearings were started in December and present plans are to continue them for many months. The Washington story was that the President either wanted some antitrust legislation enacted at the present session, or possibly action on the Borah-O'Mahoney bill for federal licensing of all corporations doing an interstate business and having assets of $100,000 or more.

Officials close to the White House denied the whispered stories. Senator Borah had a luncheon conference with the President last week. Neither President Roosevelt nor Senator Borah would make any statement, but it has been strongly intimated the antitrust question was discussed. Advocates of the Borah-O'Mahoney bill seemed to have been given hope this measure might form the basis of administration supported antitrust legislation.

Wants Action on Licensing Bill

Senator O'Mahoney, chairman of the national economic committee, is committed to a thorough study of the antitrust situation, but has indicated he would not be adverse to considering the licensing bill. Senator Borah also stated last week he intended to try to get action on it this session.

Discussing the patent question, Senator O'Mahoney said: "Among manufacturers as well as among inventors there seems to be an agreement that patent procedure should be so changed that action on a patent application may not be unduly delayed in the patent office and that an entire life of a patent from the date of the application to the date of expiration shall not be more than 20 years. One instance was brought to the attention of the committee of the extension by means of delays of the period of exclusive use from the 17 years contemplated by law to 44 years."

There was practically unanimous agreement among witnesses that congress by enactment of the patent law has given the United States a system far superior to that which exists in any other country. There seems also to be a general agreement by the witnesses heard, as well as those who testified some weeks ago at the department of justice hearings, that inventors and business still need the protection and stimulation of patents.

"ANTITRUST ENFORCEMENT LIKE TRAFFIC REGULATION"

"We may as well admit that monopolies really controlled by an efficient centralized government really interested in increasing the production and distribution of goods can be used to advance business recovery." This statement was by Thurman Arnold, assistant attorney general in charge of antitrust prosecution.

Discussing enforcement of antitrust laws, Mr. Arnold said: "Among the obstacles to effective enforcement of the antitrust laws today, is the fact that it has been considered a moral problem instead of an economic one. Necessarily, antitrust enforcement involves the prosecution of respectable people. Industrial combinations and trade associations are not recruited from the criminal classes.

"For example, when organized doctors are prosecuted for boycotting members of their own profession who associate with group health, they point to their achievements and contributions to society as a reason why they should not be prosecuted. We need a change of attitude which recognizes that the problem of antitrust enforcement is more like traffic regulation than the enforcement of ordinary criminal laws.

"We must also recognize that the reasonableness of combination cannot be determined in the abstract. Clarification of the antitrust laws can only come after enforcement with respect to particular industries, and not before. The problem of enforcement is never settled by definitions. It requires public acceptance of an active organization constantly on the job.

"The Sherman act is America's contribution to economic legislation. It was passed with full knowledge that its reasonable application required the exercise of economic judgment. It can never be reduced to a rule of thumb. Wise business leadership should be willing to accept an independent judiciary as a referee to preserve competition, rather than to drift into combinations which will in the long run require positive government control."

NATIONAL DEFENSE BILLS SUBMITTED TO CONGRESS

Literally dozens of national defense bills are being introduced in both houses these days. Some are so-called administration bills while many others simply express individual opinions of congressmen or constituents.

Senator David I. Walsh, Massachusetts, chairman of the senate naval affairs committee, has introduced three new navy bills. One would permit the President to acquire and convert as well as to construct certain auxiliary vessels for the navy. A second bill authorizes alterations and repairs to certain naval vessels and a third authorizes the secretary of the navy to proceed with the construction of certain public works.

The last congress authorized constructing a number of auxiliary vessels for the navy consisting of oil

tankers, destroyer tenders and similar boats. The first of the Walsh bills would permit the President to purchase vessels and convert them into auxiliary ships for the navy as well as to construct new vessels when proper appropriations are made. It does not authorize any additional vessels for the navy. On introducing his bill, Senator Walsh said that it had been represented to him that $1,500,000 can be saved by purchasing for the navy an oil tanker already under construction by the maritime commission for the Standard Oil Co. of New Jersey. The enactment of this bill, he said, will enable the navy to obtain an additional high speed tanker in the shortest possible time.

The second Walsh bill authorizes modernization of three submarines at an estimated cost of $5,500,000. The military value of these three vessels, Walsh said, has been seriously reduced by defects in their main propelling plants. He said the navy department is of the opinion modernization of these submarines will greatly increase their value to the navy by enabling them to maintain speed necessary for operations with the fleet.

Authorizes Air Bases

The third Walsh bill authorizes the secretary of the navy to develop or increase naval aviation facilities including authority to purchase accessories at points for air bases.

These air bases constitute a selected number from the so-called Hepburn board report to congress on the needs and location of air, submarine, destroyer, and mine bases. The total estimated cost is $65,000,000. The Hepburn board recommended the acquisition of or major improvements to 41 naval bases and the new Walsh bill, as submitted by the navy, falls far short of the recommendations contained in the Hepburn report.

AFL'S PROGRAM TO REVISE LABOR ACT BEFORE SENATE

Senator Walsh, Massachusetts, last week introduced amendments to the national labor relations act at the request of the American Federation of Labor.

The amendments, grouped in an omnibus bill, have one main objective—to guarantee fair and equitable administration of the law by the national labor relations board. They propose:

1—To make it obligatory on the board to respect the right of craft groups to decide for themselves by majority vote who their bargaining representative shall be.

2—To curtail the assumed power of the board to invalidate legal contracts between employers and labor organizations.

3—To correct the board's procedure so that all parties affected by any case will be given due notice, accorded a fair hearing, protected against abuses of discretion and assured of adequate judicial review of wrongful decrees.

Commented AFL President William Green:

"The bill carries out the nine recommendations for amendment of the act unanimously adopted by the last convention of the American Federation of Labor. I want to emphasize that it strengthens the fundamental purposes of the act by preventing arbitrary abuses of discretionary power by the board which have aroused the resentment of the entire nation."

LABOR DEPARTMENT STUDIES REQUEST FOR POSTPONEMENT

Assistant Labor Secretary Charles V. McLaughlin last Friday was in conference with labor department experts relative to request by Bethlehem Steel Co. and a number of the smaller steel mills for a 60-day postponement of the effective date of the Walsh-Healey act steel wage minimums. The decision is to become effective Jan. 31 unless postponement is granted.

Robert B. Thomas, representing the smaller companies, in a communication to the secretary asking the effective date be deferred, said in part:

"The increase in wages for government work required under the order is a very important item. In practically every case the increase will be at least 10 per cent. All my clients are small concerns, and the record in this matter clearly shows that they cannot afford such a general wage increase.

"I understand that some of my clients intend to make application in the near future for exemptions under section 6 of the act, in which, of course, they will try to set forth the very serious economic consequences that will result to them because of the determination."

PROPOSES LABOR ACT REPEAL, SUBMITS NEW MEASURE

Representative Anderson, Missouri, has introduced a bill to repeal the Wagner labor act and substitute a new act which he believes will protect workers' rights and collective bargaining. Representative Mary T. Norton, chairman of the labor committee, has expressed a willingness to review the labor act, but it is reported that friends of the measure plan to stage a battle in the committee to prevent consideration of Representative Anderson's proposal.

Under the new bill the national labor relations board would be curbed in its power and employers given a chance to combat its findings in federal district courts.

Representative May, Kentucky, has introduced a bill for the acquisition of stocks of strategic and critical raw materials, concentrates and alloys. The bill provides an appropriation of $25,000,000 per year for 1939, 1940, 1941, and 1942.

HOPKINS SOON TO REVEAL DEPARTMENT'S POLICIES

Secretary of Commerce Hopkins has indicated he will make a speech within the next two or three weeks to set forth his policy regarding various subjects at the department of commerce. He said all stories printed to date are purely speculative and that he has not discussed policies with any newspapermen, on or off the record.

Business advisory council was in Washington for two days last week. Mr. Hopkins talked with various members, individually and collectively.

$360,893 IN STEEL AWARDS UNDER WALSH-HEALEY ACT

During the week ended Jan. 21, the government awarded contracts for iron, steel and their products valued at $360,892.90 under the Walsh-Healey act, as follows: American Steel & Wire Co. of N. J., Washington, indefinite; Keystone Steel & Wire Co., Peoria, Ill., indefinite; Columbia Steel Co., San Francisco, indefinite; Baker Hamilton & Pacific Co., San Francisco, indefinite; J. K. Larkin & Co. Inc., Woodside, N. Y., indefinite; Otis Elevator Co., Buffalo, $14,070.32; The Simes Co. Inc., New York, indefinite; Truscon Steel Co., New York, $22,927; Republic Steel Corp., Canton, O., $10,904.96; Carnegie-Illinois Steel Corp., Philadelphia, $107,600; Bethlehem Steel Co., Los Angeles, $56,824.54; Koppers Co., Bartlett-Hayward Division, Baltimore, $89,000; John A. Roebling's Sons Co. of Calif., Los Angeles, $12,414.48; Kittle Mfg. Co., Los Angeles, Calif., $10,086.60; Lukenweld Inc., Coatesville, Pa., $37,065.

PIPE FITTING COMPANIES NAMED IN FTC COMPLAINT

Federal trade commission has issued a complaint charging five manufacturers with combining and agreeing to fix and maintain prices in the sale of a type of pipe fitting used in water works and gas systems and sold principally to municipalities and owners of public utilities.

The companies, said to constitute substantially all the manufacturers of such products in the United States, are Mueller Co., Decatur, Ill.; A. Y. McDonald Mfg. Co., Dubuque, Iowa; Hays Mfg. Co., Erie, Pa.; Farnan Brass Works Co., Cleveland; Kitson Co., Philadelphia.

MEETINGS

PROGRAM ARRANGED FOR DEL MONTE CONFERENCE

■ PROBLEMS having an important bearing on future industrial welfare on the Pacific Coast will be discussed at the fifteenth annual conference of the Iron, Steel and Allied Industries of California, at Hotel Del Monte, Del Monte, Calif., Feb. 9-11. Among subjects to be featured are: The industrial outlook; maintaining sound industrial relations; manufacture and distribution to meet consumer demand; how state and federal legislative proposals will affect industry; recent regulations in enforcement of the wage and hour law; and industrial cooperation in meeting California's problems.

Among formal addresses scheduled are: "The Warehouse, Able Ally of the Steel Mill," by A. O. Fulton, Wheelock-Lovejoy & Co. Inc., Cambridge, Mass., and president, American Steel Warehouse association; "Co-operation Among Industries in Meeting California's Problems," by A. J. Lundberg, president, East Bay Transit Co., Oakland, Calif.; "Unemployment Reserves Act—Problems of Administration and Enforcement and the Outlook for the Future," by C. B. Tibbetts, Los Angeles Steel Casting Co., Los Angeles.

A number of group meetings will be conducted, bringing together representatives of merchant steel dealers, reinforcing steel dealers, steel plate fabricators, structural shops, tubular products makers, foundries, and manufacturers and purchasing agents. A banquet will be served on Feb. 10.

Bethlehem Steel Co. will present its sound picture "Building the Golden Gate Bridge"; and United States Steel Corp. its sound picture "Steel—Man's Servant."

C. S. Knight, California State chamber of commerce, San Francisco, is conference secretary.

BIRMINGHAM GETS SPRING CONFERENCE OF A.I.S.E.

Association of Iron and Steel Engineers will conduct its annual spring conference at the Tutwiler hotel, Birmingham, Ala., March 27-28, under sponsorship of the Birmingham district section of which Fred M. Sturgess, master mechanic and chief electrician, Tennessee Coal, Iron & Railroad Co., is chairman. More than 500 executives and operating engineers from all important steel making centers are expected to attend.

Topics for technical sessions include: "Unique Features in Southern Blast Furnace Practice"; "General Types of Lubricants Essential to the Steel Plant"; "Modern Wire Drawing Practice"; and "Modern Soaking Pits." Visitations will be made to various Birmingham district plants, including the American Cast Iron Pipe Co. and Tennessee Coal, Iron & Railroad Co.

STEEL INSTITUTE'S 48TH GENERAL MEETING MAY 25

American Iron and Steel institute will conduct its forty-eighth general meeting at the Waldorf-Astoria hotel, New York, May 25. The program is not yet announced. Attendance at all sessions and at the banquet again will be restricted to individual members. Walter S. Tower, 350 Fifth avenue, New York, is institute secretary.

BIRMINGHAM FOUNDRYMEN IN SEVENTH CONFERENCE

Birmingham chapter, American Foundrymen's association, announces the program for its seventh annual foundry practice conference at the Tutwiler hotel, Birmingham, Ala., Feb. 23-25. Features are six technical sessions, a luncheon, an entertainment, a banquet and several plant visits.

C. M. White, vice president, Republic Steel Corp., Cleveland, will be guest speaker at the banquet, Feb. 24, and Marshall Post, vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., and national president, American Foundrymen's association, will speak at the luncheon, Feb. 23.

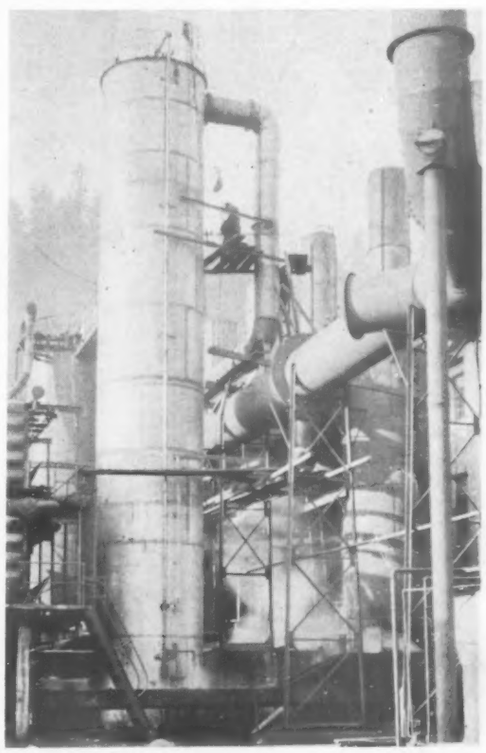
Papers scheduled for presentation are: "Blast Furnace Production of Foundry Pig Irons," by C. S. Lawson, general superintendent, Sloss-Sheffield Steel & Iron Co., Birmingham; "Causes and Effects of Pin Holes in Stove Plate Castings," by D. B. Noland, superintendent, Gray & Dudley Mfg. Co., Nashville, Tenn.; "Job Evaluation," by A. H. White, chief engineer, Stockham Pipe & Fittings Co., Birmingham; "Selection and Uses of Nonferrous Alloys," by J. W. Kelin, Federated Metals division, American Smelting & Refining Co., St. Louis; "Foundry Facings and Mold Washes," by E. J. Klumb, chief chemist, Hill & Griffith Co., Cincinnati; "Gates and Risers," by Pat Dwyer, engineering editor, *The Foundry*, Cleveland.

FOUNDRY EQUIPMENT MAKERS POSTPONE THEIR MEETING

Annual meeting of the Foundry Equipment Manufacturers' association, which was to have been held in Cleveland, Feb. 14, has been postponed until fall. Arthur J. Tuscany, Tuscany, Turner & Associates, Penton building, Cleveland, is executive secretary.

Steel "Scrubber" Used in Making Gas from Oil

■ The illustration shows one corner in the extensive gas production and chemical by-products plant of the Portland (Oreg.) Gas & Coke Co. The steel tower at the left, just completed, is an absorber, or "scrubber."



Interior is filled with wooden grids carried on I-beam supports. Gas is carried up through the tower and passes out at the top through the large pipe. Petroleum is sprayed on the top of the grids and trickles down, washing the gas and taking up benzol and tuluol. The company claims to be the only large producer making gas from oil. The oil used is a residuum, itself a by-product in the cracking of petroleum in the manufacture of gasoline.

This tower, completely welded, weighs approximately 29,000 pounds. It was shop-fabricated in two sections. Lower section is of 5/16-inch steel plate; the upper, ¼-inch. To join the two, a steel butt strap was welded to the top edge of the lower half. The upper half was then lowered into this butt strap ring and welded in the field.

● With a 64 by 170 inch working area, this is the world's largest hydraulic press for the forming and shearing of airplane parts. ● It develops a full crushing force of 11,000,000 pounds, operates on the fast working cycle of 36 seconds on short stroke. Closing and opening speed is 275 inches per minute. Action is controlled as delicately as the touch of a fingertip. ● The same care, the same service, the same engineering ability that makes this press a triumph in hydraulic press building, will be applied to your press problems by Birdsboro. Ask our engineers to cooperate. You'll find their friendly assistance helpful.

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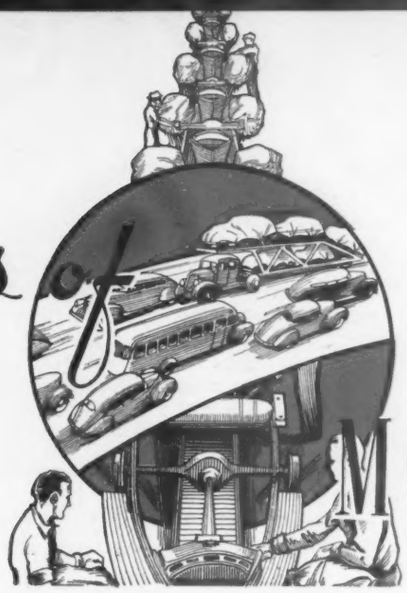
BIRDSBORO

STEEL FOUNDRY AND MACHINE COMPANY

PLANTS AT BIRDSBORO AND READING, PENNSYLVANIA

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ SHIFTS in top-flight executive personnel of the automobile industry have been numerous since the turn of the year. In some cases the moves may presage realignment of companies; in other cases they reflect the succession of veterans by younger blood; in still others the mounting of another rung on the ladder to fame.

Heading the list probably is the appointment of Joseph W. Frazer, for 15 years an executive with Chrysler Corp. and latterly vice president in charge of sales, as president and general manager of Willys-Overland at Toledo, O. Frazer is calculated to inject new life into Willys sales.

Frazer has been associated with the automotive industry for more than a quarter of a century, and in addition to Chrysler has served Pierce-Arrow and several divisions of General Motors. He succeeds Dave R. Wilson who retires but continues as director.

The question is natural as to why a prominent Chrysler executive should leave to become associated with a secondary producer with an uncertain future and a none-too-firm financial structure.

Some observers read in the change a possible acquisition of Willys by Chrysler, should Frazer be able to restore Willys to the spectacular position achieved in 1937, when nearly 80,000 small jobs were sold. The possibility of Chrysler venturing into the small car field has been the subject of speculation for the past two years, and in fact a year ago the corporation had a program of construction involving a reported $12,000,000 for plants and buildings, of which a part almost certainly was for production of a new small car. After preliminary work, this program was canceled.

Coincident with the changes at Willys has come the incorporation of the American Helicopter Corp. (see page 24).

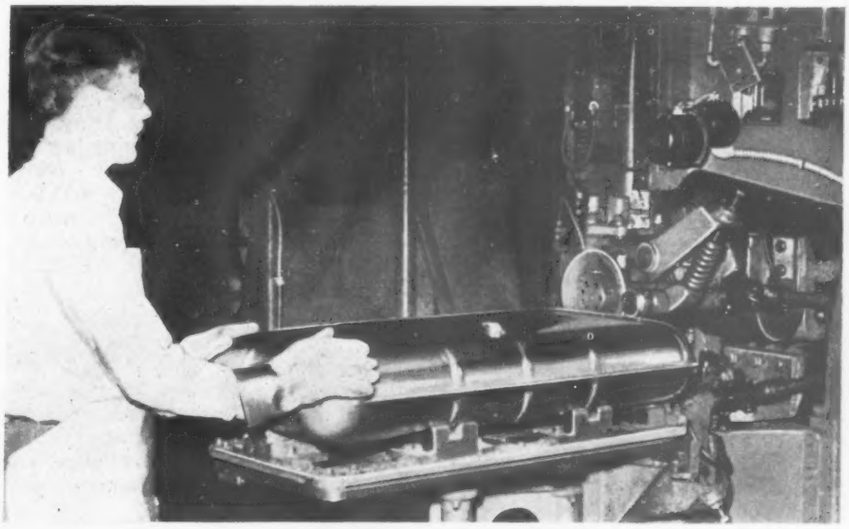
Frazer is succeeded at Chrysler by C. L. Jacobson, who formerly was manager of sales and assistant to Frazer.

Walter F. Wright, who for the past year has headed the Graham sales organization, and before that was an automobile distributor and active in patent promotion, has retired from Graham to be succeeded by F. E. Bishop, a Pittsburgh distributor. F. R. Valpey, active in Graham sales, likewise has left to become special sales representative with Hudson. A shaking up and rejuvenation of Graham sales activity is now in process.

Changes in General Motors personnel have been many in recent weeks. Lincoln R. Scafe, general manager of the Fisher Body division at Cleveland, has resigned and is succeeded by Ed Gleason, for many years an assistant to Scafe.

S. A. Woodmancy, formerly manager of the Chevrolet gear and axle division in Detroit, has transferred to Olds as manufacturing manager. W. J. Scott now has supervision of the gear and axle division as well as the Chevrolet forge division in Detroit, although the latter is being managed by Fred Skusa, hitherto

Fuel Tanks Automatically Welded



■ Electric welding of fuel tanks for Dodge cars is automatic. Formerly, with soldering, it was possible for resinous flux to penetrate seams, to form compounds with water condensing during temperature changes. As impeded fuel feed occasionally resulted soldering was discarded for welding. The tank is automatically turned under the circular seam welding electrodes

general manager of the Chevrolet forge division at Muncie, Ind. Skusa is succeeded at Muncie by H. W. Leary who in turn has transferred from the company's spring and bumper division in Detroit.

Ray Ellis, formerly general manager of the Delco Radio division at Kokomo, Ind., has taken over the post of sales manager, and is succeeded by C. S. Swayze who until the change was superintendent of plant No. 3 of Delco-Remy division at Anderson, Ind.

A number of changes have been effected throughout other units in the industry. The Hupmobile personnel, of course, has been reshuffled recently, and there have been some shifts in the Packard body division.

Whether there is any connection between the resignation of Scafe as head of the Fisher Body plant at Cleveland and the expansion which Fisher currently is undertaking at its Grand Rapids stamping division is not known. At any rate the size of the Grand Rapids plant is being doubled approximately, and contracts are reported to have been let for a new metal shop and a new press shop, the former being about 280 by 350 feet and the latter somewhat smaller. Undoubtedly extensive equipment needs will have to be filled for this addition.

The present stamping plant, formally opened late in 1936, provides facilities for stampings to supply needs of 1500 cars daily, has floor space of about 400,000 square feet, including press shop, metal shop, boiler house, gas house, substation and large die room.

■ CONSTRUCTION projects generally throughout the country are showing more life. Work will be started shortly on new buildings for Toledo Scale Co., Toledo, O., for the purpose of consolidating operations now carried out in eight smaller plants. The new structure will be about 400 by 500 feet in size, single story, with two-story office building, and located on a 40-acre tract of land just outside the city limits.

Eventually the company is planning to consolidate and expand the operations of a subsidiary, the Plaskon Co. Inc., at the new location. Space will be provided for manufacture of plastic moldings, as well as production of plastic powder for outside sale, and production of enamels and lacquers. This entire project has been under consideration for some time, but at present it appears that only the first unit—90,000 square feet of floor space for the scale company—has been given the go-ahead.

Ground will be broken in a few weeks for a machine tool company's new plant in East Hartford, Conn., another project which has been in abeyance for many months. A Cincinnati machine tool builder, expecting large-scale improvement in business, is taking figures on a new plant to provide additional manufacturing space.

An architect tells an amusing incident in connection with one of these industrial expansion projects. Instructions were issued to design the last word in modern office buildings for the job, with complete air conditioning and many other refinements. However, the architect was cautioned to conceal all these modern accessories and to subdue the interior treatment of the building, for the reason that a large number of the company's customers were farmers, and it was not deemed advisable to make the appearance of the place too impressive because of the effect it might have on these customers.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519,022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	215,296
Nov.	405 799	376,629	390,350
Dec.	518,958	347,349	*407,016
Year	4,616,274	5,016,437	*2,655,777

*Revised.

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Dec. 31	75,215	49,550
Jan. 7	76,685	54,084
Jan. 14	86,925	65,735
Jan. 21	90,205	65,418
Jan. 28	89,200	59,365

†Comparable week.

	Week Ended Jan. 28	Jan. 21
General Motors	35,265	35,440
Chrysler	23,325	23,310
Ford	21,750	21,750
All others	8,860	9,705

■ WITH temperatures flitting from zero one day to 30 the next, production experts on engine assembly lines have to keep a weather eye on the thermometer, especially where precision metal parts are being assembled. De Soto engineers say some of these parts contract or expand from 0.0001 to 0.001-inch if plant temperature varies as little as 5 degrees on either side of 70.

In engine assembly, several ingenious methods have been developed to defy sudden weather changes. When cylinder blocks first start down the line, for instance, they are run on a conveyor through a hot water bath, so that by the time these blocks reach the point where pistons, rods and wristpins are fitted, their temperature is about 70 degrees, an ideal temperature for assembly operations. A blower pours a stream of heated air on pistons at the point of fitting, warming them to the master temperature. Temperatures of both the water used to heat blocks and the air used to heat pistons are varied according to plant temperature. A special type of temperature gage gives an instant reading when placed in contact with a piston or block.

When weather is extremely hot, blocks and pistons must be cooled to normalize their size for perfect fitting. In this case the blocks are run through cold water and the pistons bathed with cooled air.

Retail Deliveries Higher

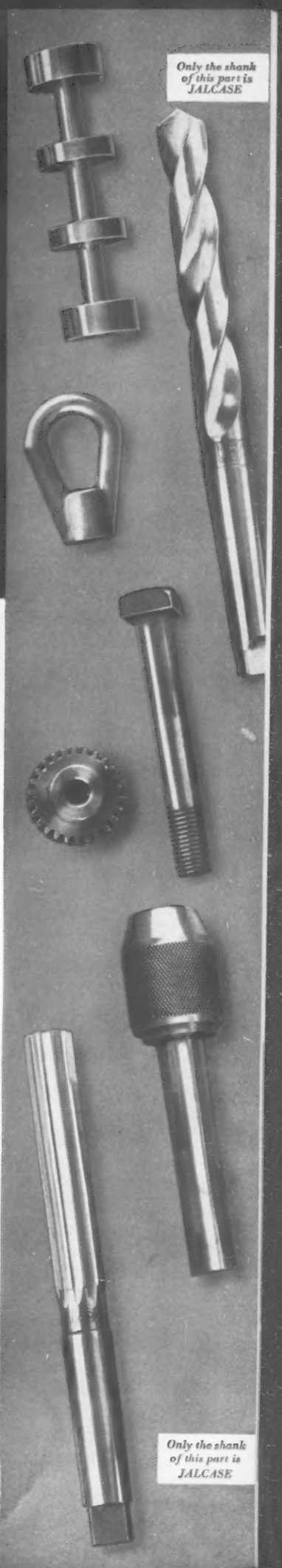
Retail deliveries of Pontiacs in the first ten days of this month were 84 per cent ahead of the same period a year ago, 3374 against 1831. Used car deliveries were off slightly, 6889 against 6927. . . . Hudson reports retail sales for the first half of January, 26 per cent higher than a year ago. . . . Ford engineers are working on a plan for building cafeterias and lunchrooms for workmen in all plants, with smoking to be allowed during lunch periods. This marks the first large-scale deviation from the Ford no-smoking rule, although the weed is now permitted in the purchasing lobby. . . . Cleavage between warring elements in the UAW is virtually complete, with the CIO disowning Homer Martin, erstwhile president of the UAW, but apparently succeeded by R. J. Thomas. Martin still claims to be president, has appropriated all records of the UAW, and the local postoffice is impounding all mail addressed to the organization pending a ruling from Washington as to whom shall be recognized officials.

Begin Nation-Wide Tour For Automotive Air Brakes

■ Bendix-Westinghouse Automotive Air Brake Co., Pittsburgh, has placed in service a fleet of three mobile display units to tour the United States and Canada.

Comprising two panels showing the standard air brake control for heavier commercial vehicles and the more recently designed air control for lighter units, the exhibits also display, in operation, air sanders, air horns and other miscellaneous devices of the modern air-controlled, transport vehicle.

Company representatives will conduct meetings and demonstrations.



MANUFACTURERS CALL

HOT ROLLED JALCASE

J&L STEEL

"THE BONUS STEEL"

Its excellent forging qualities and heat treating properties — **plus its greater machinability** ***help speed-up production and step-up profits***

Manufacturers have found that hot rolled Jalcase Steel not only makes a better and more saleable product but also cuts manufacturing costs and speeds up production. For Jalcase has this plus quality. Besides its heat treating, case hardening and forging properties, Jalcase has greater machinability than ordinary open hearth steels of a like carbon content.

Jalcase is furnished in three carbon grades—hot rolled or cold finished

JALCASE .10/.20 This special J & L Steel has exceptional forging and case carburizing properties combined with machinability approaching Bessemer Screw Stock. Because of its free cutting qualities, its use speeds up production and makes for longer tool life.

JALCASE .25/.35 - .30/.40 In the high carbon grades, Jalcase has heat treating properties which give strength and ductility equalled only by the use of costly alloy grades. Still this steel has greater machinability than ordinary steels of a like carbon content.

You, too, can enjoy these greater production economies and manufacture better and more profitable selling products by using Jalcase.

J & L metallurgists will be glad to discuss with you how this quality steel can be used in making your manufacturing operations easier and more profitable. Ask one to call at your convenience.

Write for complete bulletin on Jalcase, describing the features of this J & L product.

J & L—ALWAYS MAKING FINER CARBON STEELS FOR NEW AND BETTER USES

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

MAKERS OF HIGH QUALITY IRON AND STEEL PRODUCTS SINCE 1850

Editorial

Speculative Buying Promotes Instability

■ CAN the peaks and valleys be smoothed out of our general business curve, to the end that there will be greater stability and continuity of employment and public purchasing power?

This is a question which has agitated the minds of economists for many years. It is only recently that the necessity for cyclic fluctuations has been challenged. Under the pressure of state unemployment compensation laws and other factors, a real approach toward stabilized production and employment has been made. Certain manufacturers of consumer goods have been able to go so far as to guarantee employment over a minimum of 48 weeks per year.

Most students of the problem of smoothing sharp fluctuations out of the general business curve are of the opinion that it is impossible to stabilize fluctuations in production of materials at this time. That is an objective, they are agreed, that can be approached only after manufacturers of finished goods have made real progress in leveling the general business curve.

Harmful Unbalance Results from Present Steel Marketing System

This would be true if materials were bought by consuming companies as they needed them. But, unfortunately, this is not always the case. At times, the expectation of price advances, or the threat of labor or other disturbances, cause consumers to anticipate their requirements, often by many months. Would they buy ahead on such a large scale if they fully understood the full effects of such speculative policies?

In steel, for example, speculative buying causes grave dislocations. It is traditional in the steel industry to announce price advances several weeks before the effective date. Often on such occasions the consumer buys for three to six months ahead. Knowing that something may happen to make the customer change his mind and cancel his order, the steel mills move production to a peak in order to make shipments as rapidly as possible. After all, the most important stage of these transactions from the sellers' standpoint is that of sending out invoices and making collections.

Vital Question Presses for Solution; Can Satisfactory Answer Be Found?

Then follow the repercussions which recoil upon the companies that did the speculative buying. The story can best be pictured by visualizing what happens at the steel plants. As the heavy volume of orders begins to accumulate, pay moves up with tonnage and longer hours. New men are added to the payroll. Business is good and steelworkers and their families buy new automobiles, new refrigerators, new radios, new clothes and whatever else they fancy and think they can afford. Then, in two, three or four months, the peak is passed. Pay envelopes shrink. Men are laid off. The papers report that the steel production rate is declining.

Then comes the reckoning. There is less money in circulation. Demand for new goods of all kinds is sharply diminished. Families are unable to make weekly or monthly payments which shortly before seemed comfortably assured. Repossessions of all sorts of goods that are sold on deferred payment plans run into the millions. The effects are felt throughout industry.

In theory the problem of speculative buying seems simple. Actually it is a most baffling one— for individual companies cannot afford to refrain from buying ahead when it is the general custom in industry to do so in order to take advantage of a lower price.

But the problem is, on occasion, of vast importance to industry as a whole. Can it ever satisfactorily be solved?

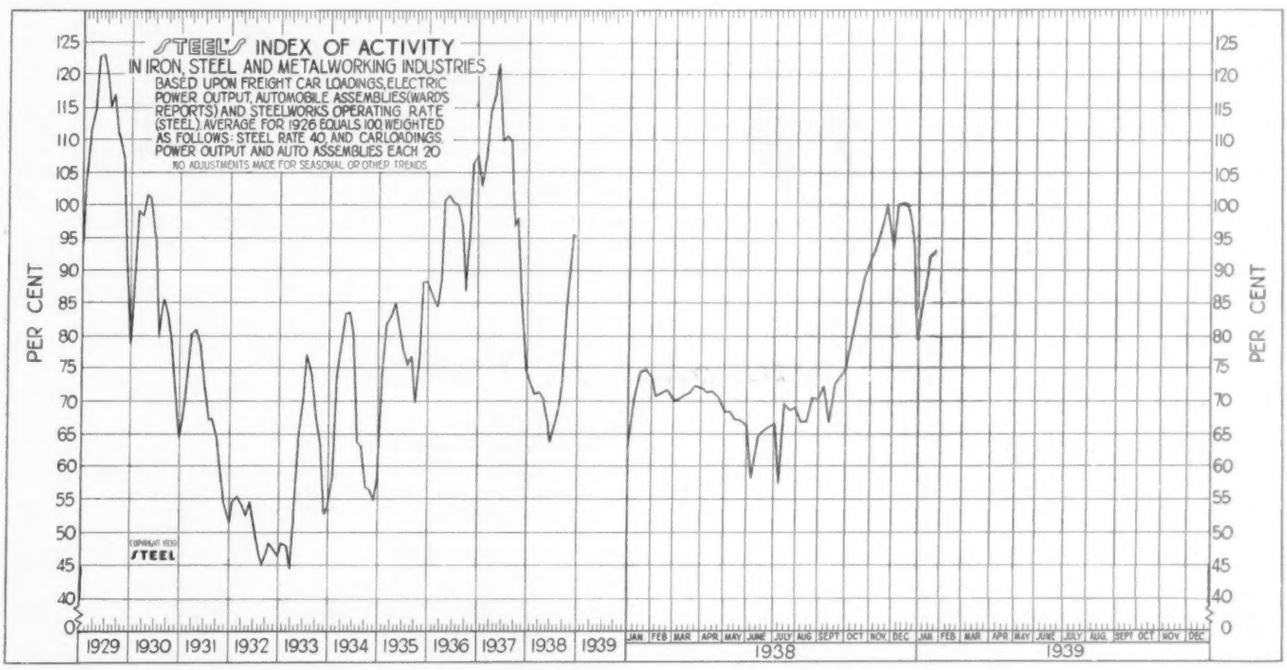
The BUSINESS TREND

Index Moves Upward, Outlook Encouraging

■ INDUSTRIAL activity in the iron, steel and metalworking industries as recorded by STEEL's index continued to move slightly upward in the week ended Jan. 21. The index now stands at 93, against 91.9 in preceding week and 74.7 in the comparable week last year. The current level of activity recorded by the index is 60.3 per cent above its 1938 low and has regained 53 per cent of the total loss incurred during the last half of 1937 and the first six months of last year.

The lone business indicator composing STEEL's index not to record a gain during the week ended Jan. 21 was steelmaking operations. The national steel rate eased 0.5 points to 51.5 per cent, but still remained substantially above the 30.5 per cent recorded in the same week last year. Little if any variation in steelworks operations is anticipated through the next few weeks.

An encouraging factor in the current business situation is the recent increase in automobile production the past few weeks, despite the handicap of adverse weather conditions which normally retard sales. Automobile assemblies in the week ended Jan. 21 were 90,205 units, against 86,925 in the previous week and 76,685 in the week ended Jan. 7. Motor car output in the week ended Jan. 21 was but 12.4 per cent below the 1938 peak of 102,905 units and represents an increase of 38.1 per cent


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 0
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
1939
STEEL

STEEL'S index of activity gained 1.1 points to 93.0 per cent in the week ended Jan. 21:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Nov. 5	93.4	92.3	102.1	88.4	55.0	52.3	48.5	56.0	71.5	98.1
Nov. 12	95.9	86.5	107.9	88.8	54.9	50.7	47.7	55.5	73.0	91.6
Nov. 19	100.4	84.9	109.9	90.9	55.2	52.6	49.2	54.8	71.0	87.8
Nov. 26	93.9	72.7	105.2	86.0	54.4	55.4	44.5	51.4	66.9	80.9
Dec. 3	100.1	81.5	108.4	91.7	51.9	49.7	45.3	52.9	69.2	85.0
Dec. 10	100.7	80.5	113.9	91.8	56.8	52.6	46.6	53.1	68.2	83.4
Dec. 17	99.8	79.4	114.8	91.9	60.6	56.0	49.3	52.3	67.3	79.7
Dec. 24	94.8	69.5	98.3	77.3	64.4	58.0	46.9	46.8	52.3	64.9
Dec. 31	79.9	62.7	96.6	78.2	60.8	53.7	42.9	48.8	58.5	74.3

	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan. 7	86.5	70.1	107.8	90.2	65.4	53.6	45.3	55.8	69.2	88.1	94.8
Jan. 14	91.9†	74.4	106.7	89.3	73.8	58.1	48.6	56.2	72.1	91.8	104.2
Jan. 21	93.0	74.7	104.0	86.0	78.1	60.9	49.8	55.8	72.9	96.3	107.5

†Revised.

over the 65,418 units assembled in the same week last year.

Revenue freight carloadings gained more than seasonally during the week ended Jan. 21. Freight traffic in that week of 590,359 cars compares with 568,877 in the preceding week and 570,333 in the comparable week in 1937. Electric power consumption also recorded an encouraging gain in the week ended Jan. 21 to 2,289,659,000 kilowatt-hours.

For the first time since September, 1937, monthly business failures during December compared favorably with the previous year. The 875 disasters recorded in December, compare with 984 during November and with 932 in December, 1937. However, liabilities showed a distinctly opposite comparison, amounting to nearly three times the November figure. Liabilities of $36,528,000 during December were the largest for any month since May, 1933. The casualties for 1938, totaling 12,836 with liabilities placed at $246,505,000 were the largest number of failures since 1933 and involved the greatest amount of liabilities of any year since 1934. In 1937 there were 9490 failures with $183,253,000 liabilities.

Reflecting the closing of accumulated inquiries for machine tools during December, the National Machine Tool Builders' association's three-month moving average index of machine tool orders increased 9.7 points to 125.6. This compares with 115.9 in November and 140.8 in December, 1937. The association's index of orders for December touched a new high for the year of 146.5, representing a substantial gain over the 112.2 recorded by the index during November and also exceeded the December, 1937, index figure of 142.7. The uptrend in volume of domestic business was accelerated in December, according to the association.

A sharp rise in foundry equipment orders also developed during December. The index of the Foundry Equipment Manufacturers' association advanced to the highest point of the year and the best level since November, 1937. Net orders for December were indexed at 141.8, against 89.7 in November and 111.2 in December, 1937. Shipments also rose, lifting the index for December to 102.8 from the November level of 94.5.

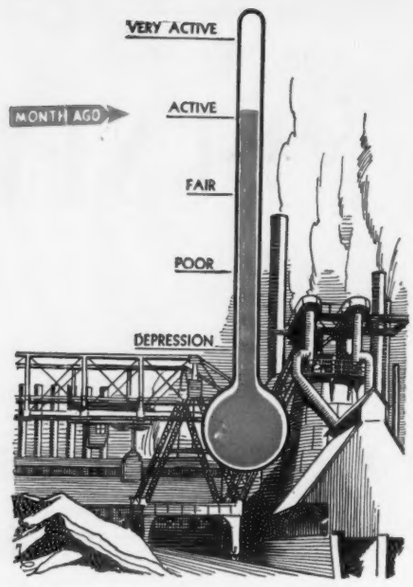
A continuation of the moderate upward tendency in industrial activity, recorded by STEEL'S index since the first of the year, is thought unlikely over the next few weeks. However, despite the apparent leveling off in activity, there is a strong enough current underneath working toward recovery to make any important decline in business doubtful and to give excellent grounds for expecting another forward movement during the early spring months.

Where Business Stands

Monthly Averages, 1937 =100

	Dec., 1938	Nov., 1938	Dec., 1937
Steel Ingot Output	75.7	86.1	35.5
Pig Iron Output	70.9	75.7	48.7
Freight Movement	79.2	86.7	76.2
Building Construction	129.9	120.4	76.8
Automobile Production	98.5	93.3	82.8
Wholesale Prices	89.0	89.7	94.7

Industrial Weather



TREND:

Unchanged

The Barometer of Business

Industrial Indicators

	Dec., 1938	Nov., 1938	Dec., 1937
Pig iron output (daily average, tons)	71,378	76,222	48,999
Machine tool index	125.6	115.9	140.8
Finished steel shipments	694,204	679,653	489,070
Ingot output (daily average, tons)	120,891	142,889	56,625
Dodge building awards in 37 states (sq. ft.)	48,548 000	45,138,000	28,718,400
Automobile output	407,016	390,350	346,000
Coal output (tons)	*36,230,000	36,110,000	37,122,000
Business failures; number	875	984	1,009
Business failures; liabilities	$36,528,000	$12,302,000	$27,818,000
Cement production (bbls.)	.....	10,184,000	7,044,000
Cotton consumption (bales)	565,000	596,000	432,000
Car loadings (weekly av.)	575,003	629,370	553,297

*Preliminary.

Foreign Trade

	Dec., 1938	Nov., 1938	Dec., 1937
Exports	.....	$252,231,000	$319,756,000
Imports	.....	$176,181,000	$208,863,000
Gold exports	.....	$14,000	$15,052,000
Gold imports	.....	$177,782,000	$33,033,000

Financial Indicators

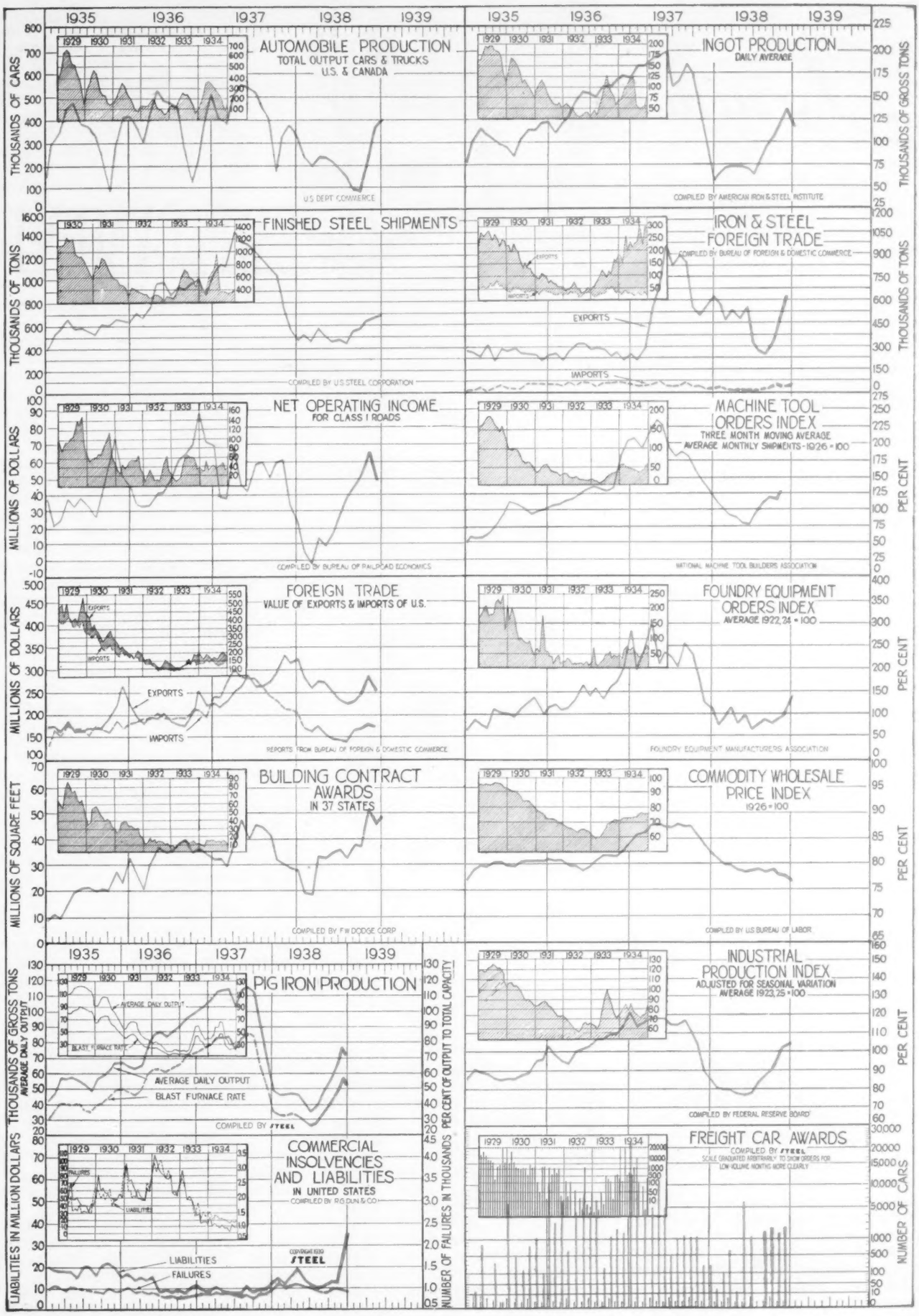
	Dec., 1938	Nov., 1938	Dec., 1937
25 Industrial stocks	$188.09	$186.99	$156.24
25 Rail stocks	$24.72	$23.59	$23.70
40 Bonds	$71.39	$72.00	$74.17
Bank clear'gs (000 omitted)	.....	$21,637,000	$25,805,000
Commercial paper rate, New York (per cent)	%	%	1
*Com'l loans (000 omitted)	$8,412,000	$8,317,000	$9,387,000
Federal Reserve ratio (per cent)	83.7	83.6	79.9
Railroad earnings	†$49,664,682	$68,565,755	$32,519,097
Stock sales, New York stock exchange	27,490,471	27,922,955	28,417,970
Bond sales (par value)	$217,717,070	$156,222,675	$198,194,025

*Leading member banks Federal Reserve System.
†November, October and November, respectively.

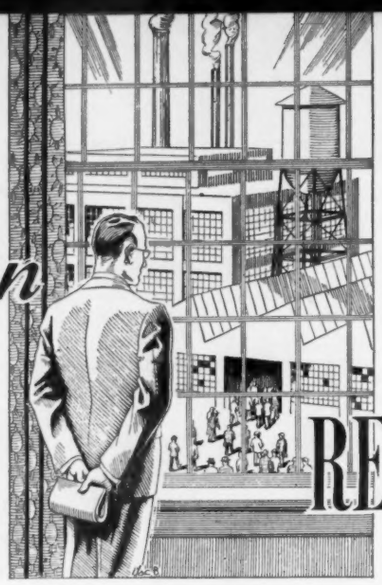
Commodity Prices

	Dec., 1938	Nov., 1938	Dec., 1937
STEEL'S composite average of 25 iron and steel prices	$36.36	$36.39	$38.88
U. S. Bureau of Labor	*76.8	77.5	81.7
Wheat, cash (bushel)	$0.81	$0.78	$1.09
Corn, cash (bushel)	$0.67	$0.61	$0.72

*Preliminary.


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
MILLIONS OF SQUARE FEET
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY
PER CENT
NUMBER OF CARS

Forum on RE-EMPLOYMENT



■ ANALYSIS of "business" and of "government" to discover the elements of which each is composed—and comparison of the two on the basis of these elements—is the method followed by E. S. Sawtelle to determine the relative fitness of business and of government to cope with the problem of unemployment.

Through this analysis and comparison, herewith presented, Mr. Sawtelle has thoroughly convinced himself that in the long run it will be through private enterprise, rather than through governmental participation in industrial affairs, that the greatest good will come to the greatest number of our people in the form of pleasant and profitable employment. He presents a rather convincing case in a manner marked by thoughtful moderation.

Mr. Sawtelle, a native of Anaconda, Mont., is vice president and general manager of the Tool Steel Gear & Pinion Co., Cincinnati, with which he became connected shortly after his graduation from the University of Cincinnati in 1907. He also is president of the Sawbrook Steel Castings Co., and is active in civic and association affairs. He was president of the American Gear Manufacturers' association in 1936.

—The Editors

■ REGARDING this vital subject of re-employment, there are today throughout the world two schools of thought. The old school holds that it is the function of private enterprise to keep a major part of the nation's employables profitably and happily at work. The new school holds that industry should be under government control and that employment of the population should be a function of government.

This latter philosophy probably is a "throw-back" to the World War conditions which brought communism to Russia and which in turn brought fascism to some other countries as a defense against communism. Today all these "isms" seem to boil down to the expression of this main idea—that the individual counts for nothing, and that government is supreme, that it can do no wrong, and therefore that it should perform or at least supervise every service.

Despite continually lowering standards of living under such philosophy as this, and despite the fact that the world is being kept in a continual state of jitters by threats of war generated among the dictator nations, a flood of propaganda not only is keeping this philosophy alive but also is spreading it. It is to me a disquieting sign of the times that our own government—through such ventures as power generation, housing projects, WPA, etc.—is assuming widespread employment responsibilities which up until recently were intrusted to private business enterprise.

Re-employment Up To Business

I am one of those who is still convinced that our problem of unemployment is not destined permanently to be solved by this shifting of the responsibility from private enterprise to government enterprise. In the various difficult periods which our country has gone through in the past, unemployment eventually has been wiped out because revival of confidence has stimulated private enterprise to revive and expand so as to absorb the idle employables in its normal production activities. I persist in my belief that this is the right answer, and we continue to manage our own company to further this end just as far as we are able to do so under present day economic conditions and government restrictions.

As we consider this question, "Shall government do it?", let us consider and weigh the qualifications of private enterprise and of the government efficiently to handle the sort of business which makes for employment. What is this thing we call business? It is not U. S. Steel, General Motors, or Ford, as is altogether too widely assumed these days. It really is a composite made up largely of thousands of little enterprises. These include the small merchants whose establishments line our streets. They include doctors, dentists, farmers and even housewives. Statistics show that in the neighborhood of half a million of these little businesses

start up every year, and that almost that many fall by the wayside during the same period.

The conclusion to be drawn is that American business—the going concerns—definitely represent the survival of the fittest. Looking at it in this light, business as a whole represents the successful working of capital to create employment. It necessarily is reasonably conservative. It is conservative because it realizes the importance of experience, because it is risking its own money, and because the jobs of all concerned in it—both of workers and management — depend upon common sense in the conduct of its affairs. If it goes wild, it goes broke.

Business is far from perfect. That seems especially true to those impatient for change. It is in many cases sorely limited by financial considerations. A vast number of enterprises maintain themselves barely on a subsistence basis and are wholly unable to do the many humanitarian things which would be done if an unlimited treasury could be tapped. Business is human. Therefore there are some hard taskmasters in management and some unreasonable, complaining loafers among employes. That should not obscure the fact, however, that there are many millions more among management and employes who are able, honest and fair minded.

Is Government Qualified?

Now, on the other hand, what is government and how is it qualified to handle or to control business? Regardless of party considerations, government is made up of individuals. These individuals have in a great many cases been selected through votes. Of late these votes have been influenced to no small degree by means of such expedients as hill-billy orchestras and promises of $30 every Thursday. Actions of these individuals of which the government is so largely made up therefore are dictated to a very large degree by what I would call vote-getting and vote-keeping considerations.

Another large group of individuals who go to make up the government are the appointees. It is no secret that a great many of them are selected because of service to the party in power—not because of any particular qualifications for the jobs, some of which are of great importance. Still another group is that coming under civil service. Their ability is tested, but it is tested by a quiz rather than on a basis of practical performance.

In all of these groups—and admittedly there are good men in all of them—ability and experience are discounted by the periodic party changes which are inevitable. Through these house cleanings not only are good men swept out but their work and even the records of it, all too frequently are destroyed.

Another point to be considered is that among the individuals who go to make up the government there is an unduly large proportion who are attorneys. While these men may be familiar with the law, a great many of them are wholly inexperienced in the multitude of business problems with which the government is now trying to deal.

Every individual in this large aggregation which makes up our government is subject to the pressure of blocs—business, labor, reform, the unemployed, to name only a few. The individual is liable to be subjected to extremely unjust criticisms and to be the victim of distorted facts. Being human he wants to hold his job and so he seeks to protect himself through catering to votes.

E. S. Sawtelle

Vice Pres. & Gen. Mgr.
Tool Steel Gear & Pinion Co.
Cincinnati

Government—unlike private enterprise—does not have to be reasonably conservative. The individuals which make it up are not personally faced with the stark realism of financial responsibility—having behind them what is commonly believed to be the almost limitless public treasury. Dramatic action is popular. If the action happens to be wrong, the public soon forgets. Panaceas such as "40 hours at 40 cents per hour," sound good to the public and are cheerfully accepted as cure-alls.

Consider how only a few short years ago the Sherman law was laid on the shelf and we all rushed into the NRA. Today we are liable to go to jail for collusion. While one department of the government is plowing under crops, another is distributing fertilizer to insure more and better crops, and still another is opening up new crop growing areas through huge irrigation projects! It may be pertinent to point out here that the one great industry in our country which has long been the pet proving ground for government control is the railway industry, the present plight of which certainly is most pitiful.

It may be even more pertinent to ask the reader to picture in his mind not only the overwhelming flood of criticism but also the prompt and decisive action which the management of any private enterprise would bring upon itself through responsibility for any such projects as Passamaquoddy, the Florida ship canal, rural resettlement projects at staggering cost, or some of the phases of TVA. Could the management of any private industry accomplish a feat comparable to juggling of the notorious CWA, FERA, PWA and WPA and succeed in "getting away with it?"

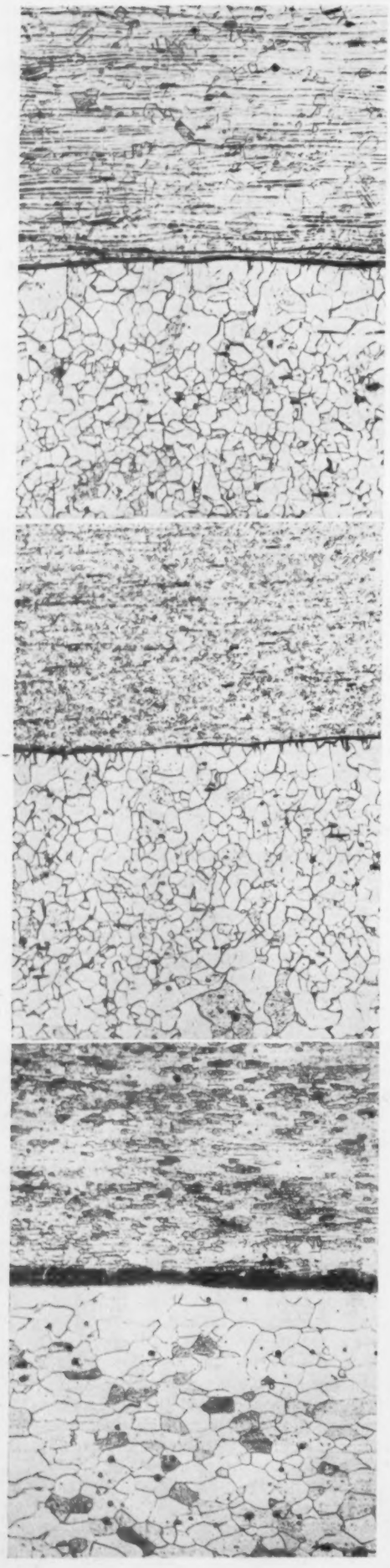
"Individual Push" Lost

A sad commentary on the whole situation is that while there has been so much talk about the great work of saving human beings, the methods followed have been such that of the vast numbers engaged on public projects, thousands have had their morale so lowered that it is a grave question whether they ever again will regain that "individual push" which in the past had made them useful in normal occupations.

With all these things in mind, does it seem possible that government can accomplish as business-like and consistent a job in the direction of large scale employment, as can properly encouraged private industry in which experience, continuity and financial responsibility are fundamental?

I am convinced of the truth of two things. One is that the best government is that which governs least. The other is that business ills, like those of the human body, have a decided tendency to cure themselves. There are numerous instances where certain progressive employers in some of the "sickest" of industries have put into effect advanced policies, whereupon competition has forced the others either to fall in line or fall by the wayside. Throughout the history of industry, actions like this within industry have served continually to raise the standard of living and to give better jobs to an increasingly large number of people.

We all seem agreed that we want our nation's work to be done in such a manner as to be of the greatest good to the greatest number. The big question is: "Where are the best qualifications toward this end to be found—in our government or in business itself?"



Composite

New process forms composite metals by adding material melted directly on the hot ingot prior to rolling. A low cost product with a perfect bond is produced

■ CHROMIUM NICKEL alloys, developed in recent years, have found many uses. But use of these almost noble metals is inhibited by their high price. At $580 per ton base price, 18-8 costs roughly 14 times as much as carbon steel.

For about half the known uses, low carbon steel with a properly applied cladding of 18-8 would serve the purpose just as well as solid stainless. The price might be half as much for the composite material as for the solid stainless. With a 1937 production of 75,851 tons of finished stainless and heat resisting alloys having an aggregate value of about $60,000,000, the desirability of composite material is obvious.

While the advantages of composites of low carbon steel and expensive metals are striking, the economies of composite metals are by no means restricted to such cases. Thus, one of the serious problems which has been encountered in the design and construction of welded steel machinery has been a lack of low cost composite metals. Machined surfaces on low and medium carbon steel are expensive as compared with machine work on steel having 0.40 per cent carbon, and it is a fact that lubrication is difficult and wear unsatisfactory for rapidly moving parts made of low carbon steel.

Building up such surfaces by manual or even automatic arc welding machines is, in many cases, prohibitively expensive. On the other hand, if the parts are made of steel having the machining and wearing qualities of 0.40 per cent carbon or more, it becomes necessary to preheat the machinery part in the welding operation to prevent it from cooling rapidly and cracking.

A notable example is in making welded steel gear blanks. The rim needs to be 0.40 per cent carbon steel, or above, to have the gear tooth cutting operation successful. The remainder of the gear blank may be medium carbon steel. The job of handling the welded type of gear blank and welding it while hot is so difficult that most manufacturers prefer to buy cast steel blanks. If a line of bar stock were available from the steel mills with say 50 per cent of the thickness 0.40 to 0.50 per cent carbon and the remainder in the 0.15 to 0.25 per cent range, most manufacturers would make their own gear blanks by welding. The rim would be formed hot with the higher carbon on the outside. The assembly of the welded steel gear blank could then be made by welding on the low carbon side without preheating.

When composite metals are to be

Top, completely processed 18-8 Mo stainless clad steel, 14-gage sheet. Center, structure of similar 18-8 Cb clad sheet. Bottom, micro-structure of 12 per cent chromium clad sheet. Here clad structure at top consists of typical ferrite and carbides. Plain carbon base structure is normal. Bond consists of small ferrite grains with a large number of carbides. All at 100 diameters

Metals Made by the Carbon Arc

By ROBERT E. KINKEAD
Consulting Engineer
Cleveland

fabricated, their usefulness is always a function of the quality of the bond between the component parts of the composite. Unless the bond is perfect, the metals separate in fabrication. Even though 98 per cent of the area of contact between the components is perfectly bonded by cohesion, the composite will be commercially unacceptable. Failure will occur when the composite is formed with the surface component in compression, or the defects will show up as blistering in service where the composite material is subjected to heat.

The requirement that the bond in composite metals be good for 100 per cent of the area of contact is the first and most important necessity. The second is that the composite shall be made by low cost methods so its manufacture and sale may be carried out to yield a profit to the maker. No low cost composite metal meeting these requirements has heretofore been available, in spite of these obvious needs.

Necessity of making the composites at low cost immediately indicates that the metal should be operated on as early in the basic process of manufacture as possible. The time to make the composite is while the metal is in the ingot or slab or, in some cases, the billet form. If the metal is made composite here, it goes through all of the subsequent rolling and processing equipment which can handle it at high speed and with low cost.

The contrasting cases of making nickel clad steel and making electroplated copper clad steel, subsequently hot rolled, illustrates the point. A 1-inch thick nickel slab may be rolled onto a 9-inch thick steel slab. Thus, by working on 1 square foot of steel 10 inches thick, 80 square feet of 10 per cent nickel clad steel is obtained when it is rolled down to ⅛-inch thickness. On the other hand, plating 0.013-inch of copper on 0.125-inch thick steel for subsequent hot rolling would be entirely prohibitive in cost, because 80 times the area would have to be operated on.

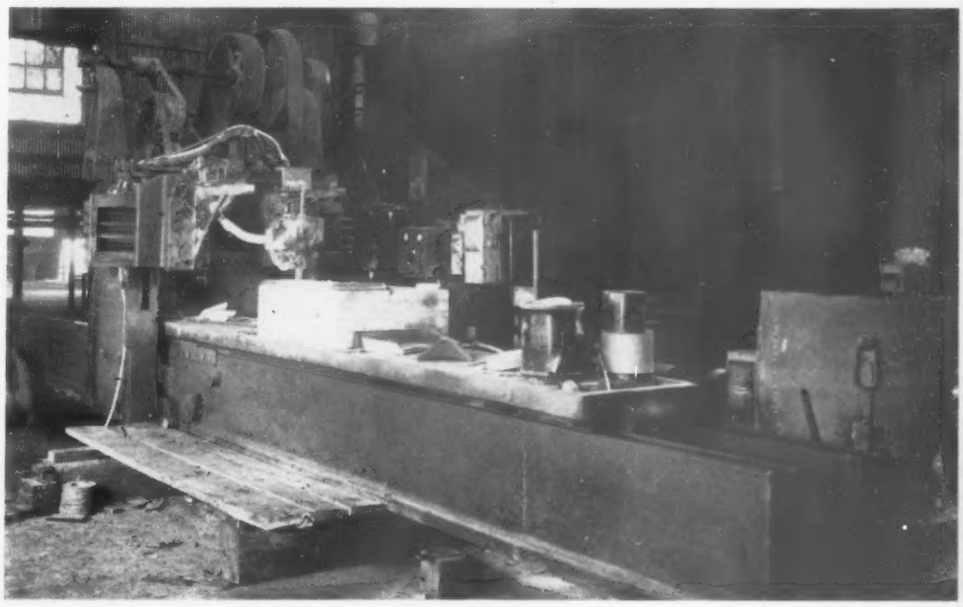
The process and equipment described here works on ingots, slabs or billets in the steel producing plant. These are further processed by existing equipment.

Considering an ingot of low carbon steel, all that is needed to make it a composite is to add the necessary alloying elements to the metal on the surface to get the desired chemical analysis. This may be accomplished readily by carbon arc welding. It would be a roundabout and relatively expensive process to coat the surface of the ingot with the alloy desired in the form of a metal wire or rod using the metal electrode arc welding process. Thus making an 18-8 surface by depositing 18-8 rod with the metallic arc would immediately involve a cost of 50c to 60c per pound for the stainless steel rod.

Making a composite having an 18-8 stainless surface, in the case of carbon arc welding however, requires only adding ferrochrome and nickel with an alloying element cost of about 8c per pound of 18-8 produced. Here the stainless steel is made directly on the ingot using the ingot metal itself as the base.

Accompanying illustration shows the experimental equipment used. An Electronic Tornado, automatic, carbon arc head is mounted on the tool carriage of a planer. Motor and cam arrangement oscillates the head transversely to the direction of travel of the planer bed. The cam was designed empirically to give uniform distribution of the heat so uniform depth of penetration of the alloy would result. Many slabs were sectioned and the penetration measured and cam corrected accordingly. Current for the arc circuit was obtained from an

Author of this paper received the third Grand Award, $8,852.94, of the $200,000 Program sponsored by the James F. Lincoln Foundation, Cleveland, in which savings of $1,600,000,000 were shown available by wider application of arc welding.



Experimental equipment used for making composite metals by carbon arc welding

800 ampere, direct current, welding set for thin alloy surfaces and from a special motor generator with an output up to 3000 amperes for thick alloy surfaces.

The furnace mounted on the planer bed preheats the slab so it can be worked on with the arc while it is hot. Planer bed speed is adjustable.

Making of composite metals proceeds as follows: The slab (0.04 to 0.06 per cent carbon, 0.20 to 0.30 per cent manganese) is put in the furnace and a suitable ground connection made to it. The alloy is applied in shallow pans of thin, low carbon steel, which are melted in the process. The bottom of the pan is covered with the correct amount of alloy. In making 18-8, ferrochrome of the low carbon specification broken down to 10 mesh is used, together with nickel shot. Molybdenum, columbium, manganese may be added, depending on the grade of alloy wanted.

The pan now is filled completely with slag, the height of the pan being designed so the right amount is present when level full. This slag is waste slag from an electric furnace in which 18-8 has been made, together with sand and calcium fluoride. Slab now is heated in the furnace with the alloy and slag properly located. An excess of slag is applied around the margin of the pans to keep the metal from flowing off the slab when the operation is in progress.

The slab is heated to a temperature of about 800 degrees Cent. as determined by pyrometer with the top of the furnace covered. The carbon arc is started after the cover has been partially removed and proceeds from one end of the alloyed surface to the other. A 6-inch oscillation of the arc and 20-inch travel were found suitable for obtaining the specimens required for testing the composite material throughout the complete rolling and processing and final testing. On 2-inch thick slabs 1800 amperes, 45 to 50 volts across the arc, 1.6-inch per minute planer bed travel were found suitable.

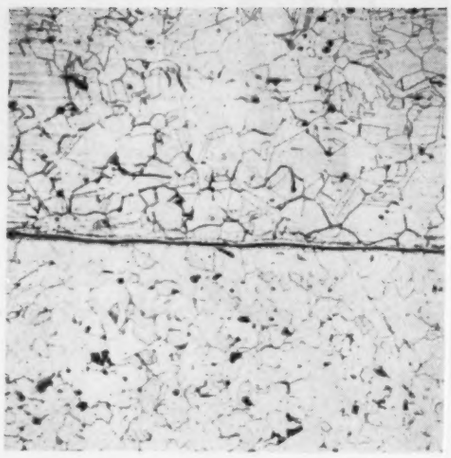
Under these conditions, the metal alloyed would stay molten from three-fourths to the total length of the travel, depending on the alloy being made. This was found to be important. Sectioning many alloyed slabs showed conclusively that no failure to obtain a perfect bond over 100 per cent of the area of contact was ever encountered without striking evidence being visible on the surface.

Defects Revealed

Thus the process was developed to the point at which there could never be any uncertainty relative to this most important consideration. Any unusual condition resulting in the presence of blow holes or slag inclusions is immediately evident on the surface of the alloyed metal.

After the alloying operation, the slab is removed from the furnace and cooled. Slag then is easily removed.

Surface of alloy is given a light grind to remove scale and uneven spots, and the slab is heated again in preparation for rolling. With test slabs, hot rolling was done first to reduce and spread the alloy. The long dimension went into the rolls parallel to the roll axis. Rolling was done in two stages—first, down to about ½-inch thickness and allowed to cool. Later the material was hot rolled on down to ⅜, 3/16-inch and to 14-gage. It was then annealed and pickled, and in some cases cold reduced down as low as 20-gage.

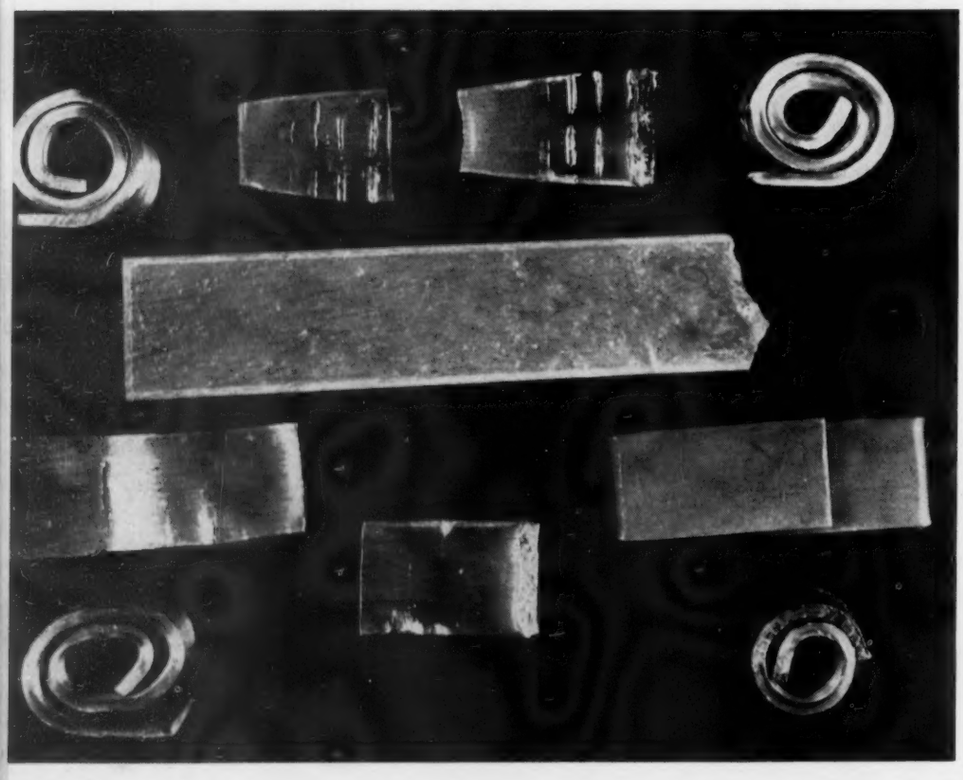


Micro-structure of completely processed 18-8 stainless clad, 14-gage sheet. Heavy grain boundaries in clad near bond indicate carbide precipitation. At 100 diameters

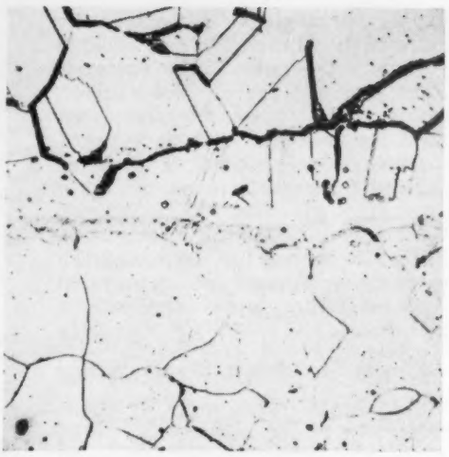
Typical chemical analysis of the alloy component of the composites thus made show the process is controllable to produce alloys in the form of composites within predetermined specifications. While the experimental apparatus was crude and difficult to control, every cause of variation was explored and the difficulties corrected in the design of the commercial equipment to be used with this process.

Show Perfect Bond

Photomicrographs show nature of bond between low carbon steel and 18-8, and condition of metals forming the composite. The illustration showing the carbon steel etched away from the stainless reveals the most desirable physical contour of the bond. It will be noted from the actual specimen furnished that the bond does not occur in a smooth plane. An apt analogy is the case of two optical flats wrung together. They cannot be separated by tension normal to the bonded surface, but may be slipped apart. The non-planer bond in this composite met-



Samples of composite metal made of low carbon steel and 18-8 deformed to show bond does not fail under any conditions



Structure of stainless clad, 14-gage sheet at 500 diameters

al is entirely free from this defect of bonding.

The illustration showing the presumably martensitic structure in a thin layer at the bond is characteristic of the process. That this layer in the bond does not affect the physical behavior is shown by the bent and severely deformed material. Many tests have been carried out in an attempt to break the composite metals apart in the bond. None has been successful.

The most severe test in the stainless carbon steel composite is the blister test where local heat is applied to the stainless side with an oxyacetylene torch. The slightest defect in bond will result in a blister where the metal is heated. No such defects have been found.

The reason for this perfect score is quite simple. Had something gone wrong in the alloying operation, it would have been discovered immediately and the defect repaired before the metal was rolled, using metal arc welding with a stainless rod. There are no defects in the rolled metal for the reason that it would not have been rolled had there been any defects present. Further, in the case of 18-8, the martensitic structure in the bond is stronger than either the normal stainless or the carbon steel. It would not be expected that the stronger metal would break before the weaker.

Cost of composite metals made by carbon arc welding includes factors with which steel mills are accustomed to deal so cost of product may be calculated easily. Thus, the alloy cost for the 18 per cent chromium, 8 per cent nickel metal is roughly 8c per pound. One 2500-ampere carbon arc will make about 2½ pounds of the alloy on the surface of a preheated slab per minute. The power taken from the line is about 1.2 kilowatt hours per pound of alloy made. Carbon electrodes, slag etc. are almost a negligible factor in the cost. Slab pre-

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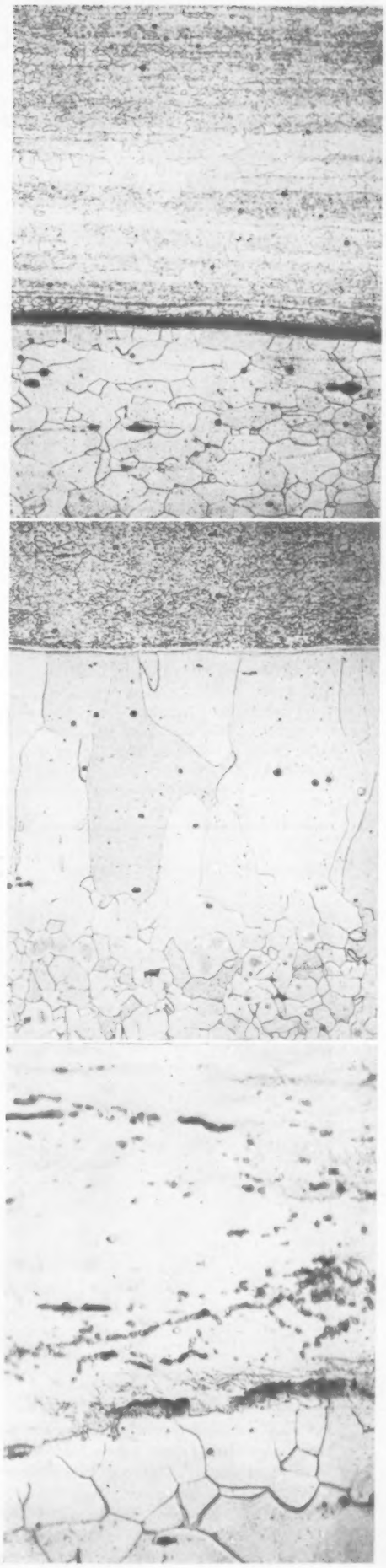


Top, 17 per cent chromium clad, 14 gage sheet showing structure similar to solid 17 per cent chromium material. Center, also 17 per cent chromium clad. Note bond is structureless. Grain growth in the open hearth steel is confined to zone next to the bond. Bottom, semiprocessed 18-8 clad on ½-inch hot rolled plate, showing in greater detail the structure where metals join. Last at 750 diameters, others at 100 diameters

TYPICAL ANALYSIS DATA ON SURFACE ALLOYED SLABS
ANALYSIS OF SURFACE

Table 1
18-8, 20 Per Cent Cladding, 2-Inch Slab

C	Cr	Ni	Preheat	Speed, inches per min.	Current Amp.	Arc Voltage
0.08	17.52	8.52	800° C.	1.55	1800	44
0.08	18.60	8.23	800° C.	1.61	1800	45
0.06	18.36	8.92	800° C.	1.52	1800	49
0.07	17.6	8.07	800° C.	1.53	1800	45

Table 2
18-8, Molybdenum

C	Cr	Ni	Mo	Mn	Preheat	Speed, inches per min.	Current Amp.	Arc Voltage
0.06	18.21	9.34	2.70	1.28	800° C.	1.55	1800	49
0.06	18.21	9.34	2.70	1.28	800° C.	1.55	1800	49
0.06	18.20	9.34	2.40	1.16	800° C.	1.51	1800	49
0.07	19.86	10.68	3.10	1.38	800° C.	1.52	1800	45
0.08	19.22	9.41	2.60	1.90	800° C.	1.50	1800	45

Table 3
12 Per Cent Chromium

C	Cr	Preheat	Speed, inches per min.	Current Amps.	Arc Voltage
0.09	11.97	800° C.	1.6	1800	43
0.08	12.59	800° C.	1.6	1800	42
		17 Per Cent Chromium			
0.09	18.33	800° C.	1.71	1800	44
0.06	17.28	800° C.	1.7	1800	45
		26 Per Cent Chromium			
0.12	25.08	800° C.	1.68	1800	45
0.09	29.6	800° C.	1.71	1800	44

Electric Welding Benefits From Improved Controls

■ PROGRESS and developments in welding practice having a profound influence on equipment design, notably control apparatus, were subjects reviewed at the winter convention, American Institute of Electrical Engineers, New York, Jan. 23-27, one session being devoted entirely to welding technique. Simplified precision resistance welder control, predetermination of temperatures in such welds, power supply for single phase resistance machines, progress in the use of alternating current, and a new electronic control circuit for resistance welders were among the topics considered.

In connection with the session a motion picture, illustrating construction of continuous rails by electric welding, was presented by William Dalton, General Electric Co., Schenectady, N. Y., who detailed the practice by which rails are joined for distances running into hundreds and even thousands of feet.

For precise timing of resistance welders, flexible control circuits have been utilized primarily on large welders. A new circuit using newly-developed types of cold-cathode electronic tubes making the application of such control practical on small welders was described by T. S. Gray and J. Breyer Jr., Massachusetts Institute of Technology, Cambridge, Mass.

A desirable feature of the control circuit is that the main tubes in it are of the cold-cathode type and do not require heating power. As a result, the strobotron and the band-igniter tubes are ready for service instantly without the time-delay requirements for cathode heating necessary with some control tubes. The only time delay in starting the unit is that inherent in the cathodes of the other tubes, which are of the radio-receiver type and require a comparable time for heating.

The control unit may be assembled in a small cabinet no larger than a table-model radio-broadcast receiver, for all the tubes and circuits in it are of low power ratings. The unit is sufficiently powerful to control the band-igniter tubes for a welder of any size.

Importance of adequate power supply for single-phase welding circuits of high capacity has become generally recognized only recently. For several years motor-driven single-phase generators have been used for practically every type of welding service. Using experience derived from performance of these generators as a basis, R. H. Wright, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., discussed the correct application of conversion equipment for future applications in welding.

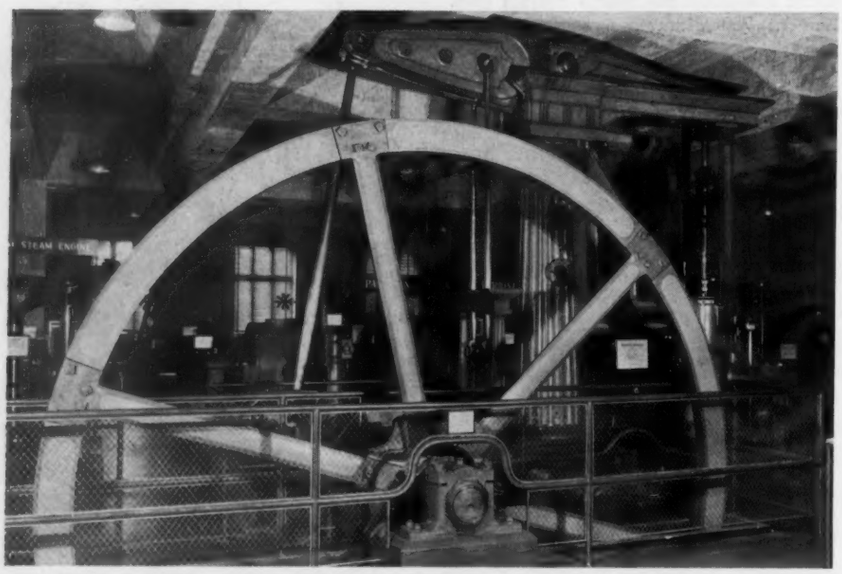
Simple Equipment Serves Well

Simple apparatus gives excellent service in many instances. Use of generators with specially-designed single-phase windings is preferable to using one phase of a 3-phase machine. Because of the vibration usually inherent in single-phase machines, welding generators should not be overloaded consistently, the speaker warned. Output voltage is controlled more readily if the peak load is not greatly in excess of the normal capacity of the generator. Rated power factor of welding generators ranges from 30 per cent for spot welders to 60 or 70 per cent for butt and flash welders.

For some applications it is desirable to operate more than one welder from a single generator. Two or more spot welders with electronic timers can be operated from a single generator of minimum capacity if an electronic synchronizing device is used to permit only one welder to be energized at one time. Such an arrangement introduces no appreciable delay in production, since each welder in turn is locked out for only a fraction of a second. However, operation of two welders simultaneously from one generator has been accomplished in at least one successful installation. In this case, each welder is controlled by a contactor and each main contactor is interlocked with a field forcing contactor, thus generator field strength is approximately proportional to the load.

In butt welding, application of generator field control operation has been improved materially, allowing equipment of greater capacity and continuous service with routine maintenance. In a recent butt weld installation, the generator is connected continuously to the primary of the welding transformer and circuit breakers in the main leads are used only for short circuit protection. A field contactor and field rheostat allow complete control of the welding cycle. Load is nearly stable during the weld, and no automatic voltage regulating equipment is needed. To meet changes in welding conditions infrequent adjustments are required. Synchronous motors satisfactorily drive generators for this class of service. To re-

Philadelphia's "Oldest" Steam Engine



■ **Interesting development of industrial and technological museums is typified by The Franklin Institute in Philadelphia where more than 4000 machines need only the pressure on a button to make them operate, a veritable "wonderland of science." Pride of the Prime Movers room is this single cylinder, slide valve, walking beam engine which has seen 83 years of continuous service at Wetherill & Brother, White Lead Works, Philadelphia. Originally constructed to develop 40 horsepower, unit now produces 140 horsepower when operating on 100 pounds steam pressure. Photo courtesy Buffalo Wire Works Co., Buffalo**

duce line peaks or the rate of input change, wound-rotor induction motors with flywheels also are used. For equalizing the peaks, a fixed slip resistance is satisfactory.

A contactor in the primary circuit of the welder transformer is usually used for power control in flash welding, the time for the making of which varies with the thickness of the metal and the volume of power which can be applied without danger of blow holes. Ten to 15 seconds is common for heavy material. A voltage regulator is not necessary to maintain satisfactory generator voltage in many flashwelding operations, Mr. Wright explained, generator field forcing generally being utilized.

Between the welds generator excitation is sufficient only to give approximate full voltage at no load. Interlocked with the main welder contactor, a field forcing contactor shunts a portion of the generator field resistance at the start of the heating period. Voltage variation during the heating period is therefore limited to under 5 per cent. The field forcing contactor opens at the end of the heating period and normal no-load excitation is restored. When closer voltage regulation is required for more uniformity of welds, a voltage regulator and quick-response excitation system can be included in the installation.

Generators Differ Widely

Due to the nature of the load, a succession of short impulses repeated at regular intervals, generators supplying single-phase power to spot and seam welders operate under conditions differing widely from butt and flash welders. Because of the brief duration of welding peaks, generator field forcing contactors are impracticable and for the same reason generator voltage regulators are of limited value. For a normal capacity approximately equal to the welding peak loads is the factor predominant in the design of single phase generators for the supplying of spot welders. Transient voltage drop and the inherent voltage drop at full load are made to be approximately equal. Excitation is kept constant at a value which will give the desired voltage during the weld. Welding time is but a small percentage of the total time in spot welding and the revolution loads on the generator and its motor are moderate. An induction motor to drive the generator is more desirable in spot welding.

A squirrel cage motor with a small amount of slip will utilize the flywheel effect of the equipment to equalize the peaks and insure stable operation. In seam welding, a motor generator will operate under steadier load conditions with a heavier motor required to carry higher average loads. A synchronous or squirrel cage motor is satisfactory with a voltage regulator with the generator in some cases to insure uniform welds.

A motor-generator with a single-phase generator of the desired frequency is required where alternating current is used in tube welding with a frequency higher than that of the regular supply circuit. According to Mr. Wright, close voltage regulation is important and a regulator should be employed. The load is steady and practically continuous with speed variations minimized allowing the most satisfactory drive from a synchronous motor.

Walter C. Johnson, Princeton university, Princeton, N. J., described several methods of analysis by which predetermination of temperatures in resistance welds is attained, notably in spot welding calculations. Predetermination of temperatures should facilitate development of welding processes and aid in design of new welding apparatus, in the speaker's opinion. For a given material the relation between temperature and weld quality may be established by comparing preliminary calculations of temperatures with results of comparatively few tests. Predictions of weld quality can then be extended to other thickness of the same material; also to various currents and periods of current conduction without additional tests. Mr. Johnson arrived at his method of temperature analysis working with comparatively thin resistance welded material.

Temperature obtained in the region of the weld is one of the most important variables in resistance welding. If too low, parts will not unite; if too high, a burned weld results. In addition to the need of proper temperature at the surfaces to be welded, it also is necessary in some work to bring a considerable portion of the metal to a plastic temperature so that pressure exerted by the electrodes can be transmitted to the surfaces to be joined. Temperature gradients, rates of heating and cooling also have an important bearing on the final quality of the weld, thus the importance of a method for the calculation or predetermination of temperatures.

Outlining the effect of pressure and contact area, Mr. Johnson stated it was reasonable to believe the resistance welding operation in ferrous materials is a forging process, adjacent portions being brought to sufficiently plastic state under pressure, causing the metals to unite. Both pressure and temperature are requisite to the production of a good weld. Spot welders

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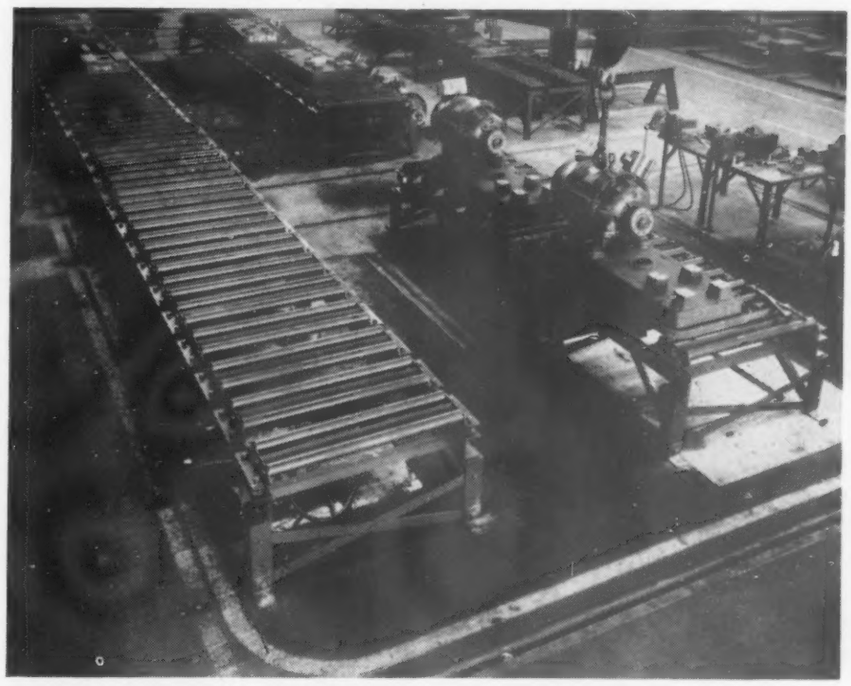
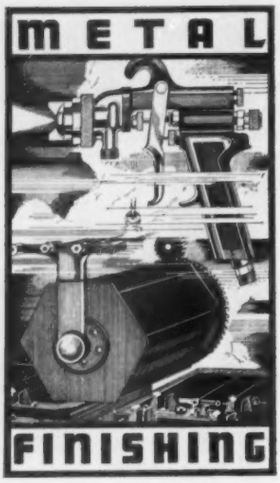
System Employs Transfer Cars



■ **Arranged in two parallel lines with a transfer car in the middle and another at the far end, this conveyor system was designed by Mathews Conveyer Co., Ellwood City, Pa., for a manufacturer of motor pumps. Transfer cars are fitted with spring-mounted roller conveyor and operate on tracks, permitting quick shunting or transfer of bed-plates weighing as much as 2000 pounds**



Cadmium on Steel

Adequate cleaning, as detailed here, proves valuable in obtaining bright, close-grained deposits necessary for maximum corrosion resistance and best protection to the steel

By E. C. RINKER
Research Laboratories
Oakite Products Inc.
New York

■ SOME METALS electroplated on iron and steel for corrosion resistance include nickel, tin, cadmium and zinc. Cadmium plating finds wide application on electrical parts and hardware of all kinds.

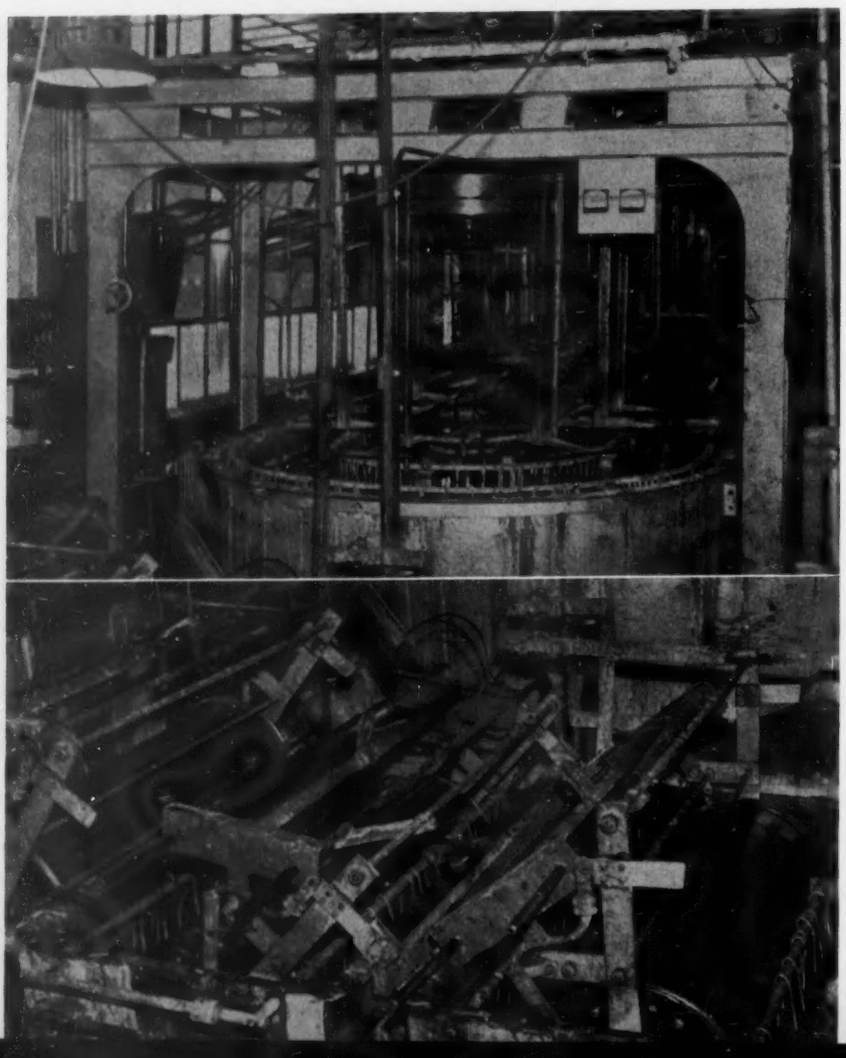
Due to its position in the electromotive series, cadmium is anodic to iron and so must corrode before the iron is attacked. Thus it provides an important protection. When electrodeposits of nickel, chromium, copper or tin accidentally cut through and base metal is exposed, corrosion begins at the point exposed and continues indefinitely. Cadmium and zinc however retard such action.

Since bright deposits are close-grained, they provide a better protection than dull deposits which consist of larger crystals, more porous and with a greater tendency to retain moisture and thus hasten breakdown of the deposit.

Use and exposure of the object regulate thickness of the deposit desired. For mild indoor use a thickness of 0.0002-inch should provide ample protection. Under severe conditions of exposure, a deposit of 0.0004-inch or greater may be necessary. Since cyanide or alkaline solutions have better throwing power, the cyanide bath is used for cadmium plating. A good solution will give uniform deposit free from pits, pores and inclusions as well as a bright surface, with a wide range of current densities. Various brightening agents may be used. An increase in cadmium content, free cyanide and sodium hydroxide in the bath tend to give fine, close grain deposits. High current densities and temperatures tend to give coarse deposits.

Small objects such as nuts, bolts and rivets are usually plated in a revolving barrel perforated and made of rubber or other non-conducting materials. Cleaned work is loaded into the barrels which are lowered into the plating solution and revolved at a definite speed. The electrical circuit is completed by the work contacting stationary bars in the barrel. Where production warrants, automatic cleaning and plating cycles of the conveyor type may be used.

As in all plating operations, the material should be chemically clean



Upper view shows modern automatic cadmium plating installation. A precleaner and a final cleaner are used here. In lower view is typical barrel plating installation working with cadmium. Both are used to plate high grade radio parts

New streamlined train, "Crusader", of the Philadelphia & Reading Railway. Built by Edw. G. Budd Manufacturing Co. and equipped with Fafnir bearings.

These famous companies come to Fafnir for Good Bearings

. . . TO HELP MAKE THEM GOOD, FAFNIR CLEANS THEM WITH

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Fafnir-equipped "pendulum" train, built experimentally by C. T. Hill, Los Angeles, Calif.

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Orthosil is the cleaner that cuts both the time and the cost of heavy duty metal cleaning. For Fafnir it is producing a better job in the plating room by giving better penetration into the minor recesses; and by rinsing freer it has practically eliminated all possibility of rejects.

Orthosil is only one of the cleaners manufactured by Pennsylvania Salt. Some are particularly effective in electrolytic cleaning due to their high conductivity. Several give quicker action than many other alkalis. All prevent grease and dirt from re-depositing on the metal. They are easy to pour, quick to dissolve; dry, highly concentrated, and economical. Pennsalt cleaners quickly remove the grease, soot, dust, and other dirt unaffected by pickling acid. Pennsalt products leave the metal clean—completely ready for further processing.

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Chemicals

before entering the bath. This involves degreasing to remove oil, dirt or carbon smut which may have accumulted during stamping, drawing or machining operations. A choice of several cleaning methods is available. Two successful methods are the patented Oakite Saturol process and the use of suitable alkaline materials.

Where the first of these is used, the work is immersed in Oakite Saturol which penetrates the oil film. After this is drained off, matrial is placed in a water spray or water rinse tank where emulsification take place. Smut and dirt particles are conditioned so subsequent cleaning operations make their removal easy. This precleaning process is valuable in removing drawing compounds, dust and carbon smut in small parts that are cleaned in baskets. A quick immersion in water cleaner or an electric alkaline cleaner is sufficient to produce a physically clean surface following the Satural process. Plants using this cleaning cycle report a uniformly bright and dense deposit.

Use of nonalkaline cleaner is practiced in many conveyor systems where racked parts are precleaned before entering the electrocleaning tank. Such precleaning materials must possess maximum emulsification and wetting out properties to be effective in removing heavy deposits of dirty oil and grease.

A still tank properly charged may remove most if not all of oil and grease before going into the electrocleaner. Precleaning in any case helps prolong the life of the electrocleaner and reduces rejects due to poor cleaning to a minimum. When used, the still tank should be designed so steam coils are on opposite side of the tank from which work is removed. The heating coils provide a flow at surface of the solution which drives scum and oil films toward opposite side of tank.

Prevent Contamination

Thus they prevent work from going through this surface scum and becoming contaminated during removal from the tank. A dam built on the opposite side of the heating coils will allow this scum and oil to overflow, thus keeping the alkaline solution in best working order. Such alkaline cleaners are used at boiling temperature with concentrations of cleaning materials from 6 to 12 ounces per gallon.

Due primarily to its speed, the alkaline electric cleaner is most popular for cleaning work before electroplating. Work is usually cleaned cathodically with a current density of from 30 to 50 amperes per square foot of work surface. Solutions are generally run near or at boiling temperature to provide increased gasing and agitation to assist in securing a physically clean surface. The same care should be used in designing the electrocleaning tank as in the still tank since oil is apt to accumulate here also.

After cleaning comes the usual acid treatment to remove light rust and scars on the steel and to provide a slight etch. Sulphuric or hydrochloric acid solutions varying from 5 to 25 per cent are used. In some cases they are heated.

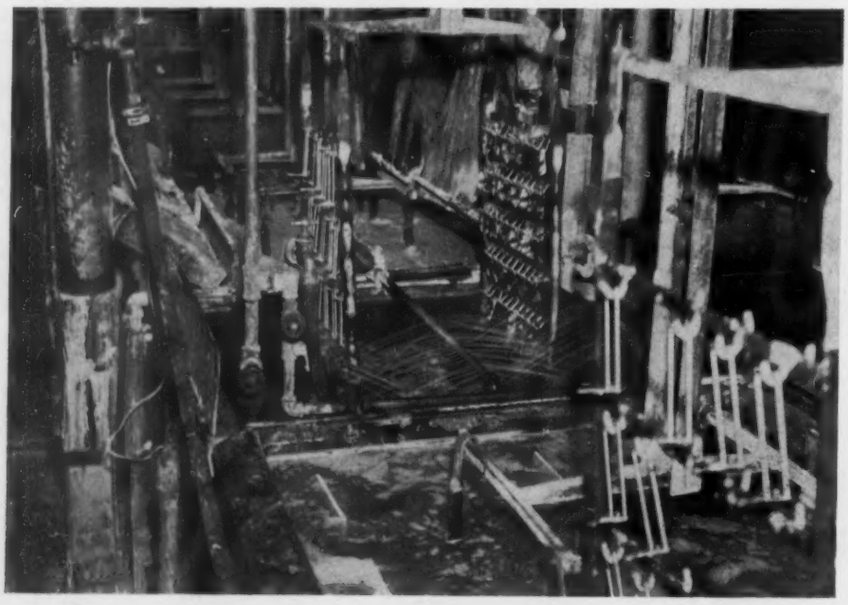
A cyanide dip follows to prevent any acid remaining from contaminating the plating solutions. The cyanide dip sometimes is used with reverse current, and it is claimed that it removes certain types of smut. Solutions generally run at room temperature with a concentration of 4 to 6 ounces of sodium cyanide per gallon.

Rinsing is most important since poor rinsing often causes rejects. Two factors are involved: The rinsability of the solution to be removed, and the mechanical rinsing facilities available. Thus rinsability is a quality to check when a cleaning compound is chosen. Good rinsing equipment and adequate water supply are essential.

Water should be introduced at or near the bottom of a solution to provide a steady flow of fresh water toward the top and near the section where work is introduced. This will tend to keep "dragout" from alkaline cleaner, acid dip and cyanide dip at a minimum. Spray rinsing from jets or nozzles is becoming more popular especially in automatic conveyor setups.

The cadmium plating bath, given properly cleaned metal, has a comparatively stable job to do. However, the cleaning solution, acid dip and rinses have a variable job depending on the nature and quantity of materials to be removed. Whatever can be done to give them an extra margin of effective working range will result in fewer interruptions to production, fewer rejects and consequently lower costs.

Inside view of automatic plating machine. Tank in foreground contains electro cyanide solution for cadmium plating. Center tank is a spray rinse which follows the cleaning solution in the third tank shown. Photos courtesy General Instruments Corp., New York

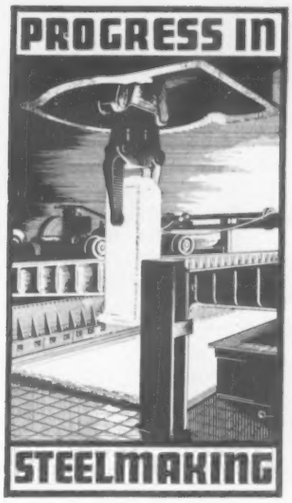


Treatise on Mineral Valuations of Future

■ *Mineral Valuations of the Future*, cloth, 116 pages, 5¼ x 8 inches; published by American Institute of Mining and Metallurgical Engineers, New York; supplied by STEEL, Cleveland, for $1.50 for nonmembers and $1 to members of the A. I. M. E.; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S. W. 1.

This work is by Dr. C. K. Leith, professor of geology, University of Wisconsin, and is published for the Seeley W. Mudd fund by the A. I. M. E. A copy has been presented to each junior member of the institute with the compliments of the fund. It is of interest to all persons dealing with the economics of natural resources, including bankers, tax officials and students.

It treats of the significance of mineral values, new conditions affecting mineral values, methods of mineral valuations, tonnage of quantity estimates, future annual production, the time element, life and deferment cost, selling prices, profit, rate of return in a mining investment and conclusion as to the future of mineral values.



Reel Improvements

Three devices or modifications added to hot mill line are found valuable aids to increased safety, decreased scrap loss and improved quality of material produced

By J. F. SPELLACY
Hot Mill Supt.
and
T. L. BURRELL
Master Mechanic
Otis Steel Co.
Cleveland

■ THE REEL shown in the accompanying illustration is one of two such devices installed at the Otis Steel Co. plant, Cleveland, in connection with its 77-inch hot strip mill. These reels are placed at the end of the hot runout table and catch the strip, with the aid of a chute, and wind the strip into a coil. These reels are synchronized with the last mill stand as to speed.

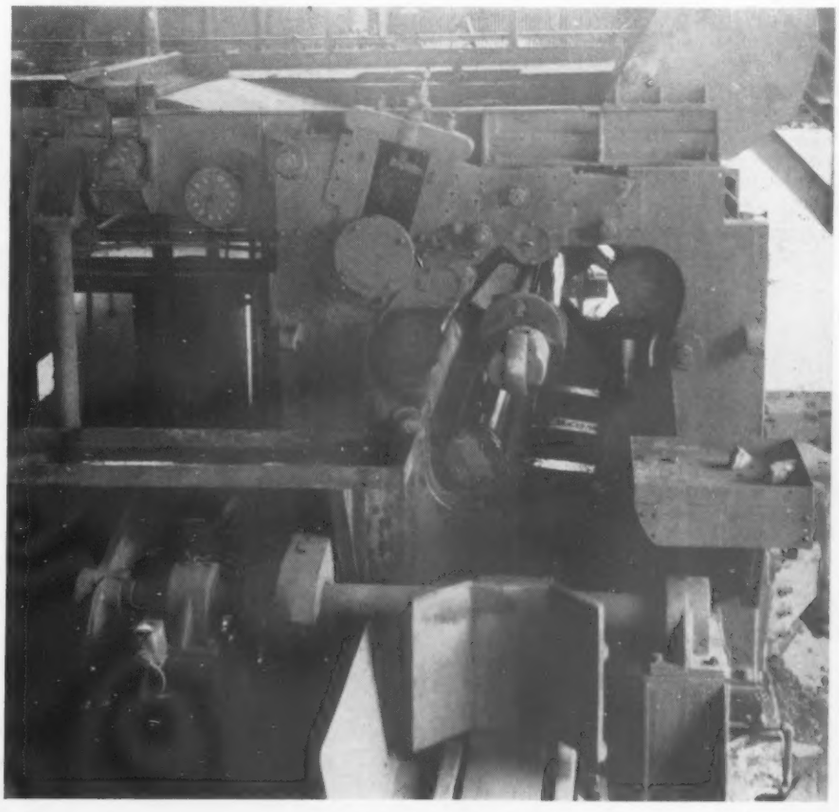
The reel itself consists of six rolls in a housing. There are apron guide plates between the rolls to guide the strip along the surface of the inside of the rolls and into a coil. Strip comes from the mill at a speed of 1200 to 1600 feet per minute, or 13 to 18 miles per hour. Naturally, the rolls of the reel and the apron plates must be in exact position to receive this fast traveling strip. The rolls are electrically controlled from the pulpit across the mill.

Sometimes a poor contact from dirt or other causes would effect the delicate electrical controlling contact points and the rolls would be slightly out of their proper position. The opening and closing of the reel rolls is controlled by a cam beneath the reel. This cam must revert to a certain position after each coil is expelled from the reel. If it does not, the rolls are off position and the strip may jam and cobble.

Thus it became most desirable to work out some method of preventing cobbles from this cause. It was soon evident that a "cam position indicator" might be a great help, and so a large dial indicator was connected to the cam. This indicator consists of a dial numbered from 0 to 12. It connects mechanically with the reel operating cam and shows the exact position of the cam at all times. If the cam controlled rolls of the reel are out of position, this condition is indicated by the dial. This gives the reel operator a chance to detect the condition and to correct the position by making any adjustments that may be required.

Throughout the period this device has been in operation at this mill, it has been found a valuable addition to the reeling equipment and has saved much expensive strip from being cobbled and scrapped.

Another device recently worked out at this mill has also been found a great aid to more satisfactory operation. In rolling some of the light gages, much trouble had been experienced due to the sharp ends of the strip being caught between



No. 2 reel at Otis 77-inch hot strip mill with coil unloader in lowered position. Cam position indicator can be seen as the dial toward upper left

the apron plates and the rolls in the reels. This would result in the strip piling up in the reels and along the hot runout tables, in turn spoiling the strip as it would cool before it could be cut out of the reel with an oxyacetylene torch. This was an expensive type of trouble not only because of the scrapped strip but also because of the expensive delay before the mill could be placed in normal operation again.

However, this difficulty was cured with little trouble by a rather simple modification. First, the rolls of the reels were grooved. Then the apron plates were cut into staggered fingers which dovetail into the grooves on the reel rolls. Now it is impossible for sharp ends of the strip to get in between the apron plates and the reel rolls, so no more trouble is experienced from this source.

A third kink that has been found valuable is not so much a mechanical feature as it is an aid to safety since it removed a decided hazard formerly present. It is a good example of how mechanical or electrical control may be substituted for manual control to increase the operator's safety.

Formerly Changed by Hand-Reel

On the entering side of the roughing mill scalebreaker there are two side guards which have to be changed with the changing of each size of slab handled. These side guards formerly were changed by a hand-reel and it was necessary for two men to cross the hot run table to make this adjustment.

This hazard was eliminated by installing a motor and speed reducer to operate the reel. Motor now is operated safely from the side of the mill by conveniently located push buttons. Thus slab size adjustments not only can be made with complete safety but it is possible to accomplish the change required in a much shorter time contributing to increased speed of the entire hot mill.

The devices described well illustrate the advantages that can be obtained by operating men familiar with every little quirk of their equipment. Quite often a modification made primarily to obtain one advantage will be found to have others of importance also. The three described above not only made jobs safer by eliminating hazards but also improved the quality of the product and lowered its cost.

Better Heating Of Ingot Molds

■ AN INTERESTING method of heating ingot molds is in use at the Lackawanna, N. Y., plant of Bethlehem Steel Co. Advantage is taken of the heat remaining in the molds immediately after stripping by using these to heat cold and wet molds. Long heating sheds, shown in accompanying illustration, are used for this purpose. These sheds are just wide enough to accommodate three narrow gage tracks laid so closely together that three rows of ingot cars can be placed side by side with minimum clearance. Length of sheds is designed to take care of the maximum number of ingot cars used in teeming one heat, while the height just leaves clearance for the longest ingot molds in use.

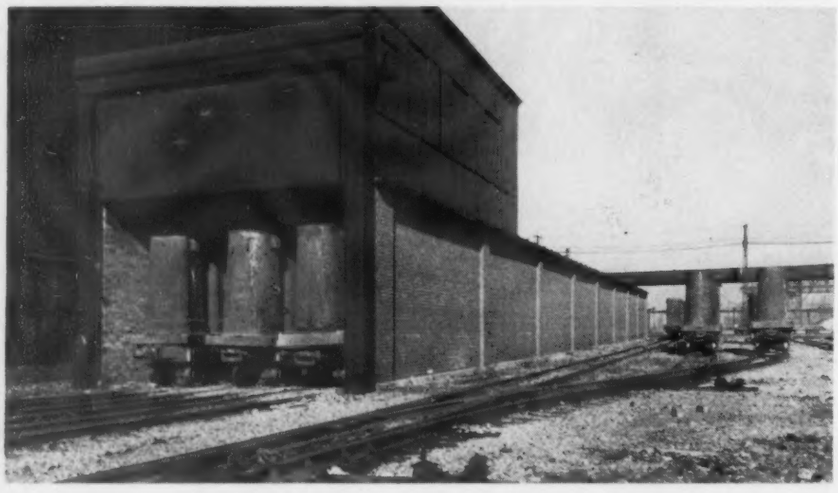
As soon as the molds are stripped they are hauled to the shed and placed on the center track with a row of cold molds on each of the outer tracks. After about three hours the cold molds have reached a temperature of 150 to 200 degrees Fahr. which means that they are ready for use.

Occasionally a rush order makes it necessary to heat the molds in shorter time. In such a case the cold molds are placed on the center track with hot molds on both sides. The molds will be ready in about 2 hours with this arrangement.

The method of heating described is particularly convenient in plants where a large number of different mold sizes are used intermittently. Although no attempt is made to heat the molds to a close temperature, the method definitely excludes all possibilities of pouring into cold molds. Pouring the steel into dry, warm molds insures ingots of greater uniformity and with better surface qualities in general.

Four sheds are in use at Lackawanna. These vary in length from 130 to 270 feet. They are made with brick walls, have a 2-inch air space for insulation and employ slightly slanting, concrete slab roofs carried on steel beams. A rolling steel door at the end, extending the full width of the shed, serves as entrance and exit for the cars.

View of special sheds employed to use heat in freshly stripped molds to warm up cold and wet molds at Lackawanna, N. Y., plant of Bethlehem Steel Co.



White Metals Plated Without Copper Coating

■ A new solution for highspeed nickel plating has been introduced by Munning & Munning Inc., New ark, N. J., under the name of Varzite. It is said this solution makes it possible to deposit nickel directly on die castings of aluminum, pewter and other white metals without using a copper undercoating. Deposit is free from black streaks. This process may be carried on in an automatic barrel plating machine. It is easy to control. Tiny stampings can be handled economically.

Lacquer Is Impervious To Corrosive Solutions

■ A line of coating lacquers, known as Miccro Supreme, for use on plating racks and for masking parts that are to be hard-chromium plated, has been introduced by Michigan Chrome Co., 6337 East Jefferson street, Detroit. Lacquer air-dries rapidly. Edges may be trimmed, and excess can be removed by a thinner. Material is said to be unaffected by hydrochloric or sulphuric acid, cyanide or acid-copper solutions, and standard or bright nickel and chromic acid baths. It is suitable for coating tanks, insulating busbars and protecting metal surfaces.

A.I.M.E. Sets Up Interesting Program For Annual Meeting in New York

■ AN ATTRACTIVE program is being formulated by the American Institute of Mining and Metallurgical Engineers for its 150th meeting at the Engineering Societies building, New York, Feb. 13-16. Of particular interest to the metals industry are the activities of the Iron and Steel and Institute of Metals divisions which start their sessions on Feb. 14.

Several events assume prominence from the all-institute point of view. These are a session on mineral economics on the afternoon of Feb. 13, at which T. M. Girdler, chairman, Republic Steel Corp., will be a speaker; the annual meeting late on the afternoon of Feb. 14; and the annual dinner at the Waldorf-Astoria, Feb. 15, on which occasion medals and honors will be awarded and new officers introduced.

Will Discuss Surface Qualities

Highlights of the Iron and Steel division meetings are two sessions on surface qualities of steels, on Feb. 15, one of which is to be devoted exclusively to stainless steels; two sessions on physical chemistry of steelmaking on Feb. 16; and the annual luncheon meeting on Feb. 15.

Important features of the Institute of Metals division meetings are two sessions on high-purity metals on Feb. 14, and the annual dinner on Feb. 16.

Further light will be thrown on the creep of metals, for the annual lecture of the Institute of Metals on Feb. 15 and the Howe memorial lecture of the Iron and Steel division on Feb. 16 will deal with various phases of this subject.

Programs for the metals sections have been arranged as follows:

Monday, Feb. 13

AFTERNOON

Mineral Economics

Address by Tom M. Girdler, chairman, Republic Steel Corp., Cleveland, and president, American Iron and Steel institute.

"What Man Has Wrought," a motion picture of Utah copper mine, Bingham Canyon, Utah, by Louis Buchman, Utah Copper Co.

IRON AND STEEL DIVISION

Tuesday, Feb. 14

MORNING

"Occlusion and Evolution of Hydrogen by Pure Iron," by George A. Moore and Donald P. Smith, Princeton university, Princeton, N. J.

"Influence of Atmosphere and Pressure on Structure of Iron-Carbon-Silicon Alloys," by Alfred Boyles, Battelle Memorial institute, Columbus, O.

"Study of Growth and Strength of White Iron for Malleable Castings; Effect of Superheating," by N. A. Ziegler, Crane Co., Chicago.

NOON

Luncheon meeting, executive committee, Iron and Steel division.

AFTERNOON

"Formation of a Solid Solution in 3.5 Per Cent Nickel Steel at Subcritical Temperature," by I. N. Zavarine, Massachusetts Institute of Technology, Cambridge, Mass.

"Study of the Lattice Distortion in Alpha Iron," by Norman P. Goss, Cold Metal Process Co., Youngstown, O.

"Reaction Kinetics in Processes of Nucleation and Growth," by William A. Johnson, Molybdenum Corp. of America, Pittsburgh, and Robert F. Mehl, Carnegie Institute of Technology, Pittsburgh.

Wednesday, Feb. 15

MORNING

Surface Characteristics of Stainless Steels

"Corrosion Characteristics of Stainless Steel—Influence of Mechanical Finishing," by H. A. Smith and S. P. Odar, Republic Steel Corp., Massillon, O.

"Experiments on Passivity of Stainless Steels," by H. H. Uhlig and John Wulff, Massachusetts Institute of Technology, Cambridge, Mass.

"Nature of Passivity in Stainless Steels and Other Alloys," by H. H. Uhlig and John Wulff, Massachusetts Institute of Technology, Cambridge, Mass.

NOON

Luncheon meeting, Iron and Steel division.

AFTERNOON

Surface Quality of Steels

Roundtable discussion.

Thursday, Feb. 16

MORNING

"Chromium in Structural Steel," by Walter Crafts, Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, N. Y.

"Allotropic Transformation in Stainless Steel Induced by Polishing," by J. T. Burwell, United States Steel Corp., Kearny, N. J., and John Wulff, Massachusetts Institute of Technology, Cambridge, Mass.

"Structure of Iron After Drawing, Swaging and Elongating in Tension," by Charles S. Barrett and L. H. Levenson, Carnegie Institute of Technology, Pittsburgh.

Methods in the Physical Chemistry of Steelmaking: Laboratory Methods

"Use of the Spectrograph in Analysis of Gases Obtained in Metallurgical Processes," by O. S. Duffendack and R. A. Wolfe, University of Michigan, Ann Arbor, Mich.

Roundtable discussion.

NOON

Luncheon meeting, committee on Physical Chemistry of Steelmaking.

Luncheon meeting, executive committee, Open Hearth committee.

AFTERNOON

Methods in the Physical Chemistry of Steelmaking: Plant Methods

Roundtable discussion.

Howe Memorial Lecture

"Some Things We Don't Know About the Creep of Metals," by Dr. H. W. Gillett, chief technical advisor, Battelle Memorial institute, Columbus, O.

INSTITUTE OF METALS DIVISION

Tuesday, Feb. 14

MORNING

High Purity Metals

"Pure Zinc, Its Preparation and Some Examples of the Influence of Minor Constituents," by Gerald Edmunds and E. C. Truesdale, New Jersey Zinc Co., Palmerton, Pa.

"Pure Tin," by Bruce Chalmers, Sir John Cass Technical institute, and D. J. Macnaughton, International Tin Research and Development council, London.

"Characteristics of Very Pure and Commercial Lead," by G. O. Hiers, National Lead Co., New York.

AFTERNOON

High Purity Metals

"Properties of Nickel," by E. M. Wise and R. H. Schaefer, International Nickel Co. Ltd., New York.

"Platinum and Palladium," by C. S. Sival, Baker & Co., Newark, N. J.

"High Purity Silicon," by A. B. Kinzel and T. R. Cunningham, Union Carbide & Carbon Research Laboratories Inc., New York.

Wednesday, Feb. 15

MORNING

"Extrusion of Tin and Its Alloys," by Gerhard Derge, Carnegie Institute of Technology, Pittsburgh, and J. W. Stewart, Lafayette college, Easton, Pa.

"The Supposed High Temperature Polymorphism of Tin," by C. W. Mason and G. E. Pellissier Jr., Cornell university, Ithaca, N. Y.

AFTERNOON

"Martensite Transformation in Beta Copper-Aluminum Alloys," by Alden B. Greninger, Harvard university, Cambridge, Mass.

"Simultaneous Diffusion of Nickel and Silicon in Solid Copper," by Robert F. Mehl and Frederick N. Rhines, Carnegie Institute of Technology, Pittsburgh.

Annual Lecture

"Creep of Metals," by Prof. D. Hanson, University of Birmingham, England.

Thursday, Feb. 16

MORNING

"Some Aspects of the Recrystallization of Cold-Worked Aluminum and Aluminum Alloys," by L. W. Eastwood, R. W. James and R. F. Bell, Aluminum Co. of America, Cleveland.

"Age Hardening in Magnesium-Tin-Silver Alloys," by Bruce S. Old and John T. Norton, Massachusetts Institute of Technology, Cambridge, Mass.

"An X-Ray Study of the Iron-Palladium and Nickel-Palladium Systems," by Ralph Hultgren, Harvard university, Cambridge, Mass. ,and Carl A. Zapffe, Battelle Memorial institute, Columbus, O.

NOON

Luncheon meeting, executive committee, Institute of Metals division.

AFTERNOON

"Some Properties of Low Lead-Silver Alloys Pertinent to Their Use as Bearings," by R. W. Dayton, Battelle Memorial institute, Columbus, O.

"Tensile Strengths at Elevated Temperatures of Fine Wires of Some Platinum Alloys," by H. E. Stauss, Baker & Co., Newark, N. J.

"Effect of Composition on the Color and Melting Point of 10K, 12K and 14K Gold Alloys," by Tracy C. Jarrett, American Optical Co., Southbridge, Mass.

EVENING

Annual dinner of Institute of Metals division.

"WE LACKED THE

8 OUTSTANDING ADVANTAGES: 1. Non-corrosive, non-tarnishing to ferrous and non-ferrous metals. 2. High stability . . . will not turn rancid. 3. The sulphur is permanently incorporated in the body of the oil and will not separate. 4. Color and clarity permit close inspection of work — without stopping machine operations. 5. Will not gum or form deposits on machine tool parts. 6. Minimum carry-off. Machine parts easily cleaned. 7. Readily miscible, can be blended cold with low-viscosity mineral oils. 8. Longer tool life and freer cutting.

INDUSTRIAL TYCOL OILS-GREASES

TIDE WATER

THERE IS A COMPLETE LINE OF TYCOL LUBRICANTS

THIRD ESSENTIAL

...until we adopted Tide Water Cutting Oil"

"For first-class work three things are indispensable: excellent machines, excellent operators, and excellent Cutting Oil. We had the first two, but were lacking the third until we adopted Tide Water Cutting Oil. The chasers on the die heads are giving us far better service now. We used to sharpen them three or four times a month. Now they run six months without sharpening. That means we keep the machines in almost constant service. Threads are clean and free from the usual small clinging chips. Rejects are practically eliminated. The machinist can easily take the micrometer readings on the well-cooled steel and is certain of his measurements. There is no piling up of chips. In addition, I save about 50 gallons of oil per year on each lathe because the oils drain off clean and rapidly from the chips."

This plant superintendent was talking facts. They are typical of the dollar and cents saving reasons why manufacturers who try these modern oils adopt them. Tool life is lengthened. Finishes are finer. Tarnish is a thing of the past. Cutting Oil will not turn rancid. It will not gum or form deposits on machine tool parts. It has everything that a good oil should have for ferrous and non-ferrous metals from light machines to heavy broaching machine work.

Write for a copy of the new Tide Water Cutting Oil booklet. You will find it extremely helpful. Tide Water Associated Oil Company, Tide Water Division, 17 Battery Place, New York, N. Y.

TIDE WATER CUTTING OILS INCLUDE:

1. Tycol Transparent Non-Tarnishing Sulphurized Oils. 2. Tycol Sulphuretted Transparent Oils. 3. Tycol Sulphuretted Dark Oils. 4. Tycol Mineral Lard Oil Blends. 5. Tycol Soluble Cutting Oils.

THE IDEAL OIL FOR EVERY CUTTING NEED

TRANSPARENT
NON-TARNISHING
SULPHURIZED

CUTTING OILS

SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

Continuous Rayon Spinning

By saving 67 per cent in cost, welding makes economically possible new machine which spins, processes, dries and twists rayon yarn in one continuous series of operations. Machine eliminates handling between steps; lowers plant investment; produces more uniform, higher quality product

By R. F. BERGMANN
Chief Engineer
Rayon Machinery Corp.
Cleveland
and
A. F. MacDONALD
Designing Engineer
American Bridge Co.
Pittsburgh

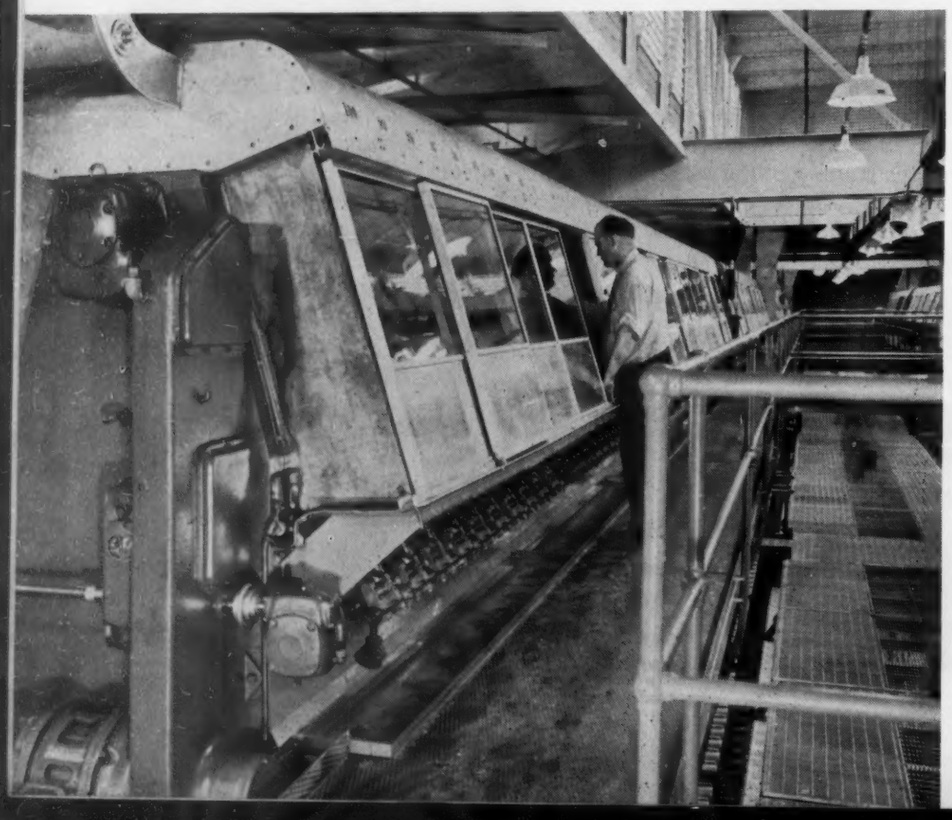
■ SINCE EFFORTS to lower the cost of viscose rayon yarn by reducing the number of processing steps resulted only in inferior yarns, progress in cost reduction and quality improvement appeared to lie in economically obtaining the required series of treatments with minimum handling. Work in this direction culminated in development of a new continuous process and its commercial application by Industrial Rayon Corp. at its new 14-acre plant, Painesville, O.

Here wood fibres, the raw material for the process, are received in what look like large sheets of coarse blotting paper. This material is treated and finally dissolved in chemicals to form viscose. Upon being extruded from a small hole in an acid bath, the viscose coagulates to form a filament of yarn, this step being called spinning. Preparation of viscose prior to spinning is the same by the new process as in the conventional system.

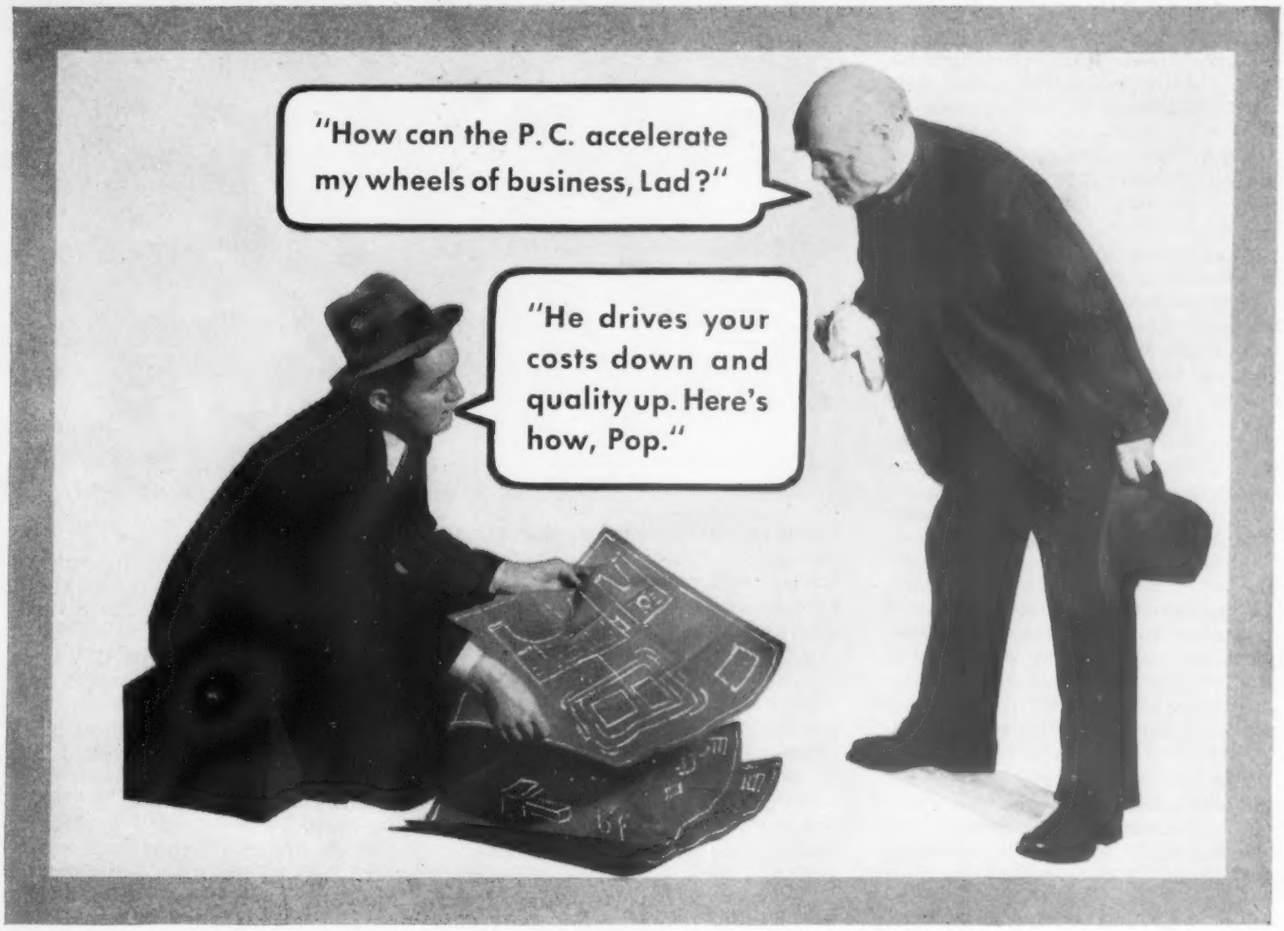
However spinning, washing, desulphurizing, bleaching, lubricating, drying, twisting onto bobbins and handling between these steps, formerly entailing separate operations, are all combined into one continuous series of operations in the new process. The machine which does this is economically possible only when made of welded steel. On the basis of the best competitive price quotations, welding showed a cost saving of over 67 per cent compared to other methods of construction. Weight was similarly reduced.

In this machine, a positive displacement pump forces viscose at a carefully controlled rate through from 40 to 80 small holes in the end of a spinning jet submerged in the acid bath. As viscose enters the bath, it coagulates, each hole producing a separate filament of the yarn. In each of the 96 machines, a common spin trough containing

The authors received the fourth award, $1,526.33, of the Industry Machinery classification of the $200,000 contest sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland.



At the top of each 3-tier continuous machine, spinnning reels wind the yarn out of the acid tank as fast as it is formed and feed it down to the processing reels banked on each side of the machine in the center tier. Each 100-end machine has a 10-horsepower motor driving five longitudinal shafts at the top. A single shaft at extreme top transmits power to the spinning reels through 25 gear boxes, each with four angle take-offs. Below on each side, just below the aluminum and glass doors, a shaft drives individual pumps for the spinning jets. Below these, two other shafts drive the inclined shafts inside the stepped process panels seen on pages 54, 55, 58



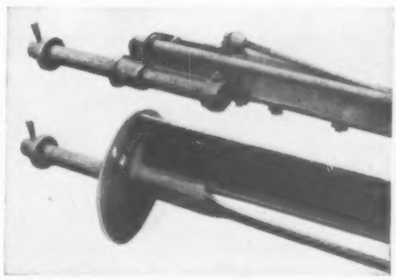
HOW YOU CAN PROFIT MOST WITH WELDING

● "Let's look at the records, Pop. Here's one company whose business grew from $200,000 to $5,600,000 in 6 years—largely through the drive of their P. C. (story on request). I could cite hundreds of cases of companies that have followed the plan I'm going to tell you about and who are today getting more r. p. m. and fewer

squeaks from their wheels of business.

"The plan is simply this: Call to arms a crusading executive with a yen for welding and give him the authority to 'go to town.' Since the results of his efforts are increased profits, we call him the Profit Crusader, or P. C.

"Here is an example of the work of the Profit Crusader in one plant. The part is an axle of a hay rake, formerly consisting of an assembly of castings and truss rod which frequently became loose in service, requiring repair. The Profit Crusader took an angle iron, flat bar and plate and welded them into a permanently rigid unit. The farmer got a shimmy-proof hay rake and the manufacturer saved 30% on the part.



"There's an attractive booklet available for the asking which gives some valuable suggestions for the Profit Crusader. Write for a free copy. And by all means, get in touch with the nearest Lincoln office. These people will do you and your wheels of business many a good turn."

Largest Manufacturers of Arc Welding Equipment in the World

THE LINCOLN ELECTRIC COMPANY

DEPT. Y-566 **CLEVELAND, OHIO**

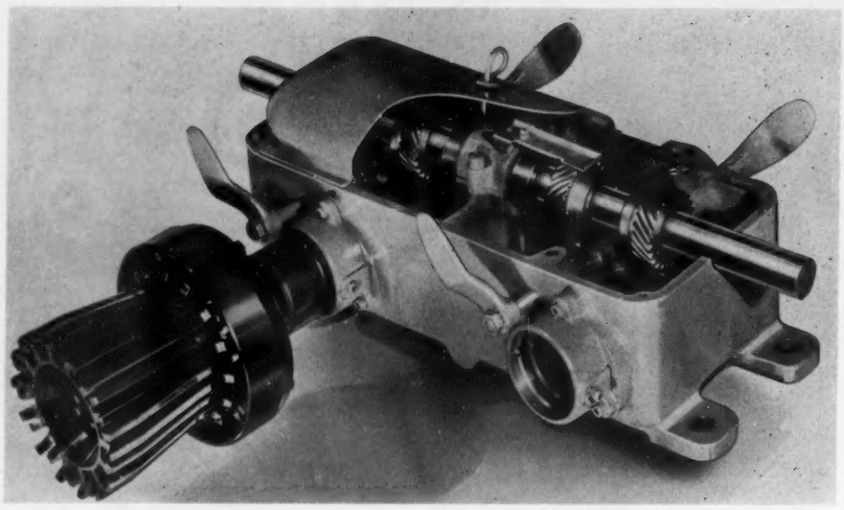
the acid bath at top of the machine serves 100 spin jets, 50 on each side. Thus 9600 individual yarns can be spun simultaneously at this plant. Yarn from each jet passes over 10 reels which form a vertical stepped series down the side of the machine.

Each machine contains 100 spinning ends, thus has 1000 reels; a total of 96,000 in the plant.

At each reel, the yarn is processed in some manner. These reels form a most important feature of the new machine. They contain an ingenious arrangement for continuously advancing the yarn towards the discharge end. Each reel is constructed of two cages, or slat pulleys, set one within the other and of the same outside diameter. These are rotated as an overhung assembly. However, they do not rotate on the same center. Also their axes are not parallel. This means that the yarn travels on one pulley during half of revolution, on the other during the remainder of the revolution. This advances the yarn on the reel a predetermined amount at each revolution, causing a threading action and making possible the continuous processing system.

The first nine reels in each of the 10-reel processing trains are made of plastic, the tenth or bottom reel is used for drying. It is made of aluminum. Liquid drops from a bent glass tube above each of the processing reels drain off in a hard rubber trough below the reels.

The continuous processing system results in great improvement in quality of the yarns because every portion of the yarn is treated equally, thus assuring a uniformity of texture and color heretofore extremely difficult to attain.



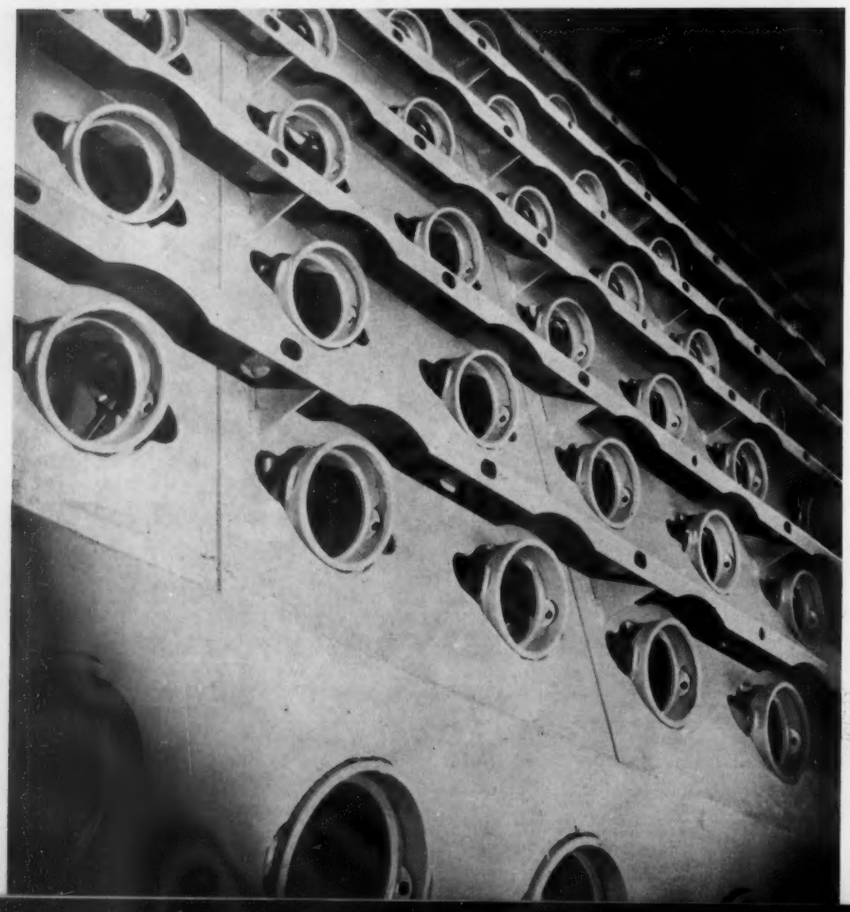
Plastic spinning reel mounted on transmission unit which serves four reels. Total of 2400 gear boxes like this are used in addition to several thousand which drive the inclined shafts operating processing reels

Spinning machines have three operating levels. The top level contains the acid tank and spinning reels which are mounted above the tank to take the yarns from the tank. Yarn travels over all reels at a uniform speed of 4 feet per second.

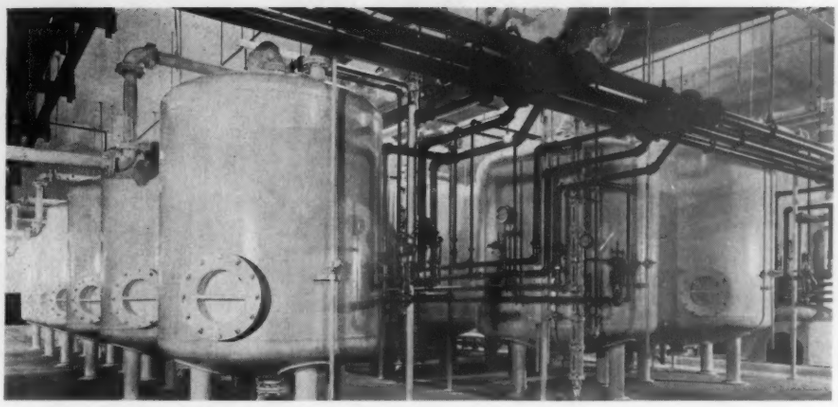
At the intermediate level are stepped inclined processing panels with reels, liquid drips and drains. Reels are driven at a constant speed from back of panel by inclined vertical shafts connected to main longitudinal drive. Each yarn passes through a series of ten reels in line vertically. Top or spinning reel takes the yarn from the acid bath. Next eight process the yarn. The tenth reel at bottom of the machine is really at the floor tier or working level.

Here, under an aluminum cover, yarn is dried and passed to a twister mechanism where it is wound on a bobbin, all in about 5½ minutes from acid tank to bobbin. This compares with four days by previous methods, thus indicating the extreme rapidity of the process. Such rapidity means that less material need be kept in process, and there is no problem of where to store large quantities of material in process.

At one end of the top tier of each spinning machine, a 10-horsepower motor drives five shafts extending lengthwise the unit. Top shaft drives the 100 spinning reels through 25 gear boxes with four angle takeoff on each. Just below the aluminum and glass panels alongside the acid tanks are a row of 50 positive displacement pumps feeding individual spinning ends on that side, 100 on the two sides. These drives are through a variable speed transmission which permits adjusting speed of pumps to produce yarns of various weights. Two lower shafts each drive inclined shafts, 50 on a side, which in turn rotate the reels.



All-welded steel, stepped, process panels supported on welded A-frames are the heart of the continuous spinning machine. Made of punched plates and shapes, these panels have flanged cups which support the reels. Cups must be positioned accurately for correct meshing of drive gears on final assembly, so were carefully jig welded and checked



A few of the many welded steel tanks used in storing and processing material

Thus one motor drives 100 spinning reels, 100 pumps and 900 processing-and-drying reels. Clutches permit disconnecting any vertical series of reels for loading or adjustment.

A second motor, 15-horsepower, mounted near the floor, furnishes power to the twister drive on each spinning machine. Machines are installed end to end so one set of pipes carries liquid to two machines. Each machine, however, has its own set of drives.

Accuracy a Problem

Each stepped inclined processing panel has room for ten vertical rows of reels. With five panels on a side, each spinning machine spins and processes 100 yarns simultaneously. The 96 machines in the plant produce 9600 yarns, employ 96,000 reels and require 960 processing panels in their construction. The economical construction of these panels and the A-frames on which they are mounted was one of the huge problems facing the designers of this plant.

It was not merely the quantity involved, it was the extreme accuracy required to assure the perfect alignment of all rotating drives and parts that constituted the problem.

When detailed designs were submitted and competitive quotations received on a construction using standard materials without welding, the cost was found prohibitive. Even when most expert manufacturing and machining by quantity methods were utilized, the original cost could not be cut more than 25 to 30 per cent, which gave a figure still too high to be practical.

Submitted to fabricators for competitive quotations on welded steel construction, several designs were produced. The design described here and developed by American Bridge Co. showed a cost saving of more than 67 per cent over the best competitive unwelded design. This brought the entire project within the realm of practicability and so welding made this plant economically possible.

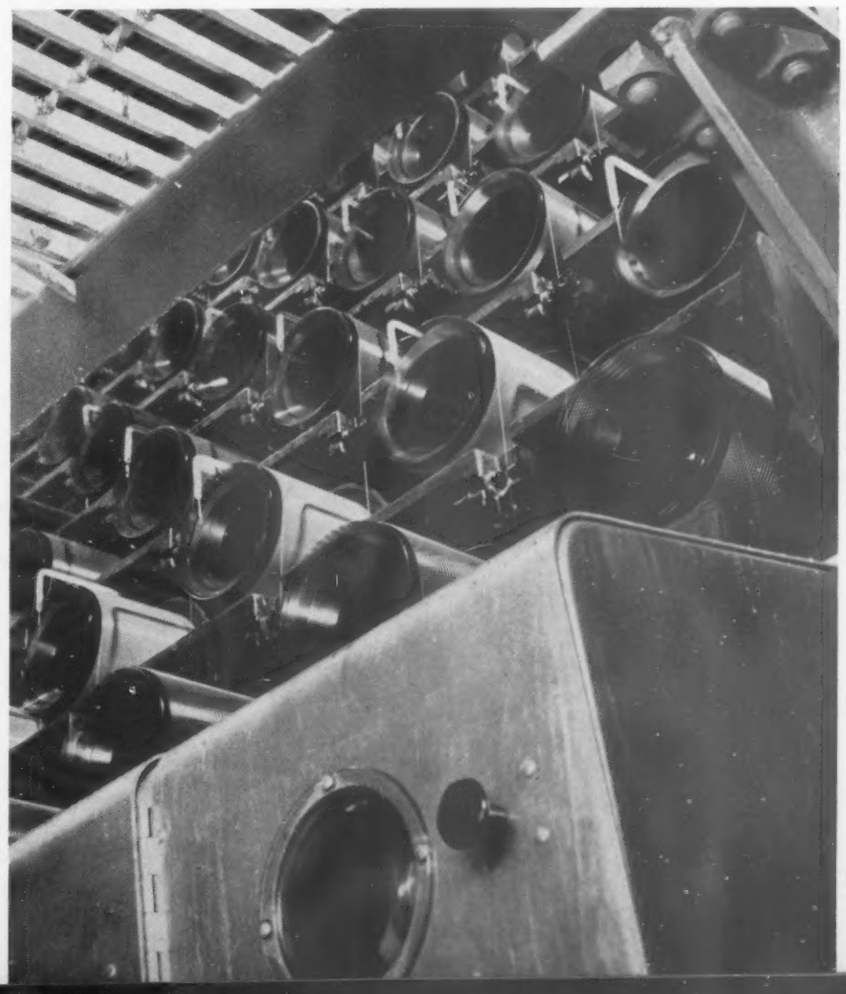
It is expected that this new spinning machine will gradually replace existing equipment, and that expansion of present plants or the buildings of new plants will require large numbers of identical or similar machines. Because of this prospective volume, the design is especially advantageous as efficient facilities for production of these machines are already available.

The design was carefully thought out to facilitate the use of jig welding. This was of prime importance in reproducing, at low cost, parts that would be interchangeable and accurate in dimensions. Moreover, since the first contract covered 960 panels with mounting cups for 86,400 reels, rigid, permanent jigs were made of heavy, structural steel parts, accurately positioned and welded. These jigs have all been used many times and will be available for future reproduction of parts.

The intention of the spinning machine design was to avoid any machining of surfaces for accuracy after the assembly was welded together and removed from the jigs. Except in two parts, the necessary accuracy was realized without resorting to machining after welding.

Before mass production of the major parts of the spinning machine was undertaken, experimental sample parts were made and carefully checked. In doing this, the accuracy and efficiency of the jigs and production methods were determined.

Much skepticism was expressed as to the practicability of securing the required accuracy by jig welding methods before the experimental parts were made. Many felt that dis-



Bank of processing reels as seen from floor looking up through the grilled walkway which constitutes the second tier level. Yarn passes down reels in succession vertically, is treated by chemicals which drip onto reels from bent glass pipes above each reel. Excess liquid drains into hard rubber trays below each row of reels. Dryer reel at bottom is enclosed in aluminum cover shown

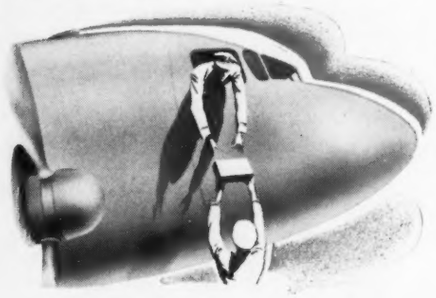
An Overworked Word

FAFNIR

Gets a Shot in the Arm

Just what is this word "service"? . . . A salesman's promise? . . . An embroidered motto gathering dust on the shipping room wall? Do the thousands who use it every day really stop to think what it means?

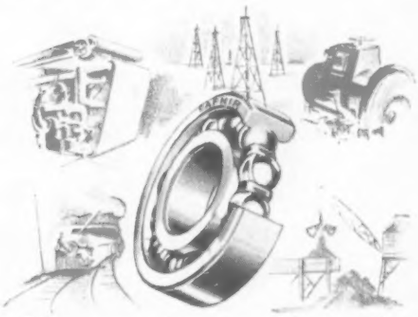
Most manufacturers don't misuse the word "service". They live up to it, in terms of promptness. Fafnir customers like promptness, too . . . and *get* it . . . Witness the Detroit customer who rang us up at 12:15 the other noon-day for a WIR 320 (weight about 20 pounds) . . . It arrived in Detroit that evening at 6:30 and was carrying its half-ton load frictionlessly an hour and a half later.



It's dramatic to rush a big ball bearing halfway across the continent between noon and nightfall . . . but to Fafnir, Service goes much deeper into customer-relations than mere promptness in putting an idle shaft back to work. For Fafnir knows that the careful, painstaking, undramatic service rendered to *prevent* emergencies means far more to bearing users than hustle and bustle when a breakdown comes.

Take a typical case . . . a plant where keen-eyed engineers are ruling lines on paper . . . lines which will some day take shape as a new, more efficient machine. You say they don't need Fafnir Service yet? *Their Fafnir Service started long ago*, with the development of the most complete line of ball bearings in America . . . started with the training of Fafnir engineers now familiar with the field into which the new machine will go . . . conversant with the problems involved in adapting ball bearings to its shafts. Or perhaps their Fafnir Service started when some special bearing type was extended, as is Fafnir's policy, into a full range of sizes within which their exact needs will be met.

As the months go by, and their machine swings into production, they will thank Fafnir for another phase of Service . . . the balance in industries served . . . which dictates that Fafnir's customer-list shall maintain its breadth . . . so that either a recession or a sudden boom in any industry shall in no way affect Fafnir's ability to serve the remainder.



Then, some day years hence, when a long-used Fafnir in one of their machines requires replacement . . . a Fafnir representative may drive all night . . . or an airliner may carry a package. Someone will remark, "Quick service!" . . . And the Fafnir customer will smile to himself, thinking how small a part of Fafnir Service the rush delivery truly represents. The Fafnir Bearing Company, New Britain, Connecticut.

BALANCE IN ORGANIZATION

In the Fafnir organization, customer-minded production men are balanced with production-minded sales engineers. The resulting teamwork provides customer service and cooperation of an unusual sort. . . . And Fafnir executives spend much of their time in the field. Results: Fafnir production schedules are geared to customers' needs. The minds of those who guide this Company harbor none of the intolerance that grows in men who see no farther than their shipping rooms.

Ball Bearings

THE BALANCED LINE . . .
MOST COMPLETE IN AMERICA

tortions caused by welding would produce inaccuracies after the pieces were removed from the jigs, particularly in the stepped processing panels. However, these parts have all been produced in multiple and in actual practice show that welding distortions are not of sufficient magnitude to interfere with securing the required accuracy.

From the experience gained on this contract, it is believed that many types of machine frames and supports, hitherto believed impractical to fabricate by welding, may now be undertaken with confidence.

Process Panel. Except for the cups and a few steel stampings, all elements composing the complete stepped processing panel are of standard, commercially rolled plates or shapes, punched, sheared, bent and sawed with usual equipment found in a structural fabricating plant. The cups which hold the reel mounts were blanked and formed into the shapes shown, and counterbored and tapped after forming.

Extreme accuracy was required in the alignment of these cups in the panel to insure proper operation of the bevel gears driving the reel shafts placed at the rear of each cup on the panel. This was secured by assembling all the parts in consecutive order in a jig. Auxiliary fixtures in the jig were provided to hold all parts accurately in position. Parts were then welded together to form the frame with the cups as yet entirely free.

Cups then were positioned accurately by attaching to plugs in the jig base, after which they were welded to the processing panel frame. Alignment of cups was checked by 100 per cent inspection of panels after completion. A marked templet showing the exact location of the axis of each cup enabled two inspectors to check a panel in 30 minutes. Cups found out of line were removed and replaced, using portable jigs especially made for that purpose. Only 20 cups out of 35,000 of record needed replacing.

Done with ease, this operation also permits cups damaged during erection or in service to be replaced. In most cases, cups were misaligned due to improper attaching to the jig, not from distortion due to welding, it was found.

Machinery Boxes. At the top of each spinning machine, a steel box made of commercial plates, bars and rounds encloses the various drives. Containing 30 parts, each box was assembled in a jig and completely welded; then taken to a horizontal boring mill, where all boring and spot facing was done in one setup to secure required accuracy. Also small pads were machined in this setup to establish accurate gage points. After being completely machined, the box is assembled with the drives and machine frame, proper alignment being established by the machined gage pads.

The two motors used on each 100-end spinning machine are flange mounted. Duplex or back type silent chain drives from the motors to the machines have tension maintained by spring-backed automatic idlers, mounted on studs set in the casings.

Drive End Frame. The large A-frame at the drive end of each spinning machine is made of structural plates and shapes. Column sections were bent, milled on bottom ends and flame-cut to angle on top ends. Bearing plates were carefully pressed, straightened and jig drilled for accuracy.

Parts then were placed in a jig with fixtures properly positioning all elements. Bearing plates were attached to machined pads. The complete machinery box was placed in the jig, machined pads on the jig registering with machined bosses on the box. All welding was completed before the frame was removed from the jig and no other machining or fabrication was necessary except holes in the flanges of the columns, which were drilled using an integral drilling templet. Other A-frame sections were fabricated in a similar manner.

Traverse Lifter Beam. These beams comprise the two cross members for each traverse table of the cap twister, five such tables being used on each 100-end spinning machine. Lifter beam is made of structural shapes and two pieces of mechanical tubing for the vertical guide rod bushings. By using this accurate tubing, it was possible to jig weld all parts together after prefabricating and to avoid any drilling or boring after the piece was removed from the jig. This construction permits a weight less than half that of a conventional unwelded member.

All welding on spinning machines was done using the shielded, manual, metallic arc process.

The saving in original plant investment made possible by the welded spinning frame was such as to permit a 3.1 per cent or 3.1-cents saving per pound of annual capacity on the installed cost of equipment producing 11,000,000 pounds of yarn annually at this plant.

If, for other reasons such as

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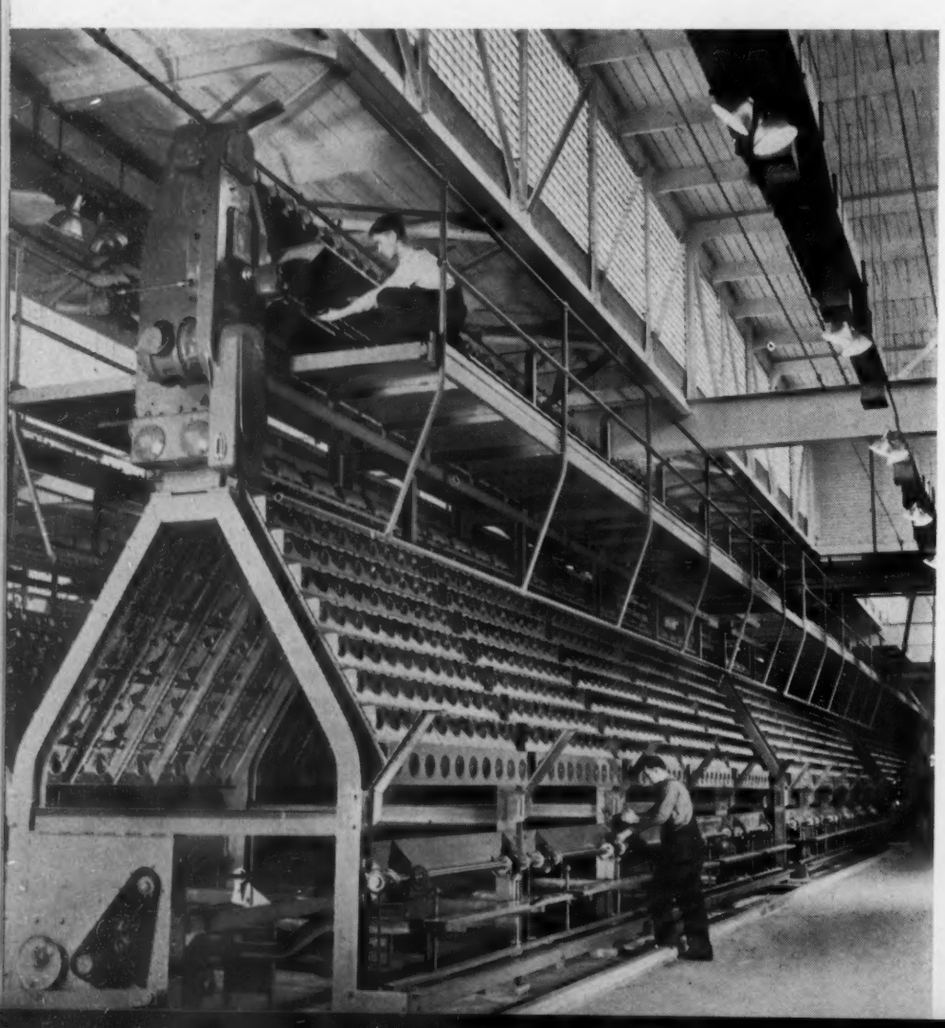
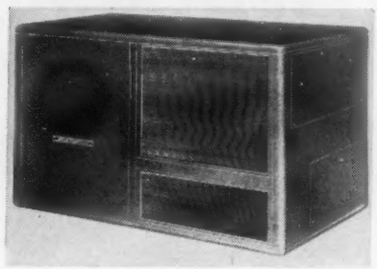


End view of spinning machine. Yarn proceeds from spinning reels at top tier, through processing reels at center tier (the grating or platform for which will be placed just above the head of the workmen on the floor), to the bobbins at floor level. A 10-horsepower motor at top drives the reels. A second motor, 15-horsepower, drives the cap twister mechanism at the bottom

NEW METAL PRODUCTS

■ A complete line of self-contained air conditioning units for commercial applications, varying in capacity

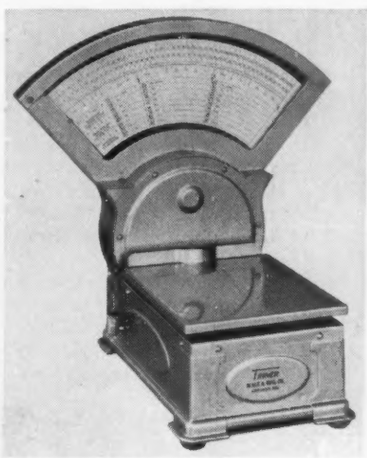


from 1 to 15 tons, has been developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Packaged in an enclosed, allsteel welded cabinet, each unit is a complete air conditioning system, said to deliver results expected from individually engineered air conditioning equipment.

Three of these units are the central-system type, and four are for installation within the space to be conditioned. Lightness of weight is a feature. Units have hermetically sealed compressors. Two switches permit flexibility of operation: One controls the entire cooling mechanism, and the other, the blower motor.

■ Designed especially for use by publishing houses, manufacturers and other companies having a large volume of outgoing mail, this allsteel automatic computing scale recently was introduced by Triner Sales Co., 53 West Jackson boulevard, Chicago. Because of its unusual accuracy, this scale is said to save a great deal of time by eliminating the complicated computation necessary when less reliable equipment is employed.

Steel platform is placed directly



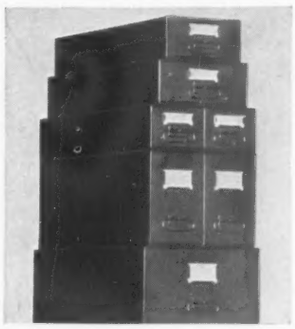
in front of the indicator and chart. It is full-floating in design and cannot jam or bind.

■ A new gas steam radiator, available in both vented and unvented types, which operates automatically without boiler, water pipes, coal or janitor service, has been developed by American Gas Steam Radiator Co., Pittsburgh.

Constructed of cast iron, this radiator has a Bunsen burner entirely enclosed in a combustion chamber directly under the water chamber. Gas supply is controlled automatically by steam pressure within the radiator. This arrangement assures maximum heat with minimum consumption of gas.

In operating the radiator, water is poured into the filling cup and the burner is lighted. Within 30 minutes there is a steam pressure of 6 pounds.

■ Said to cost actually less than flimsy, improvised boxes and shelving, a line of Safe-T-Stack steel files



has been introduced by Steel Storage File Co. 2216 West Sixty-third street, Cleveland, for the storage of semi-active and inactive records.

Files are heavy sheet steel with welded joints and reinforcements. They resist fire and offer protection against dampness and rodents. A locking device eliminates the danger of a loaded drawer or stack tipping. Files are equipped with drawer sleds and gliders for easy operation.

Although designed for record-filing, these units may be utilized for storage of tools, supplies and small parts. Special sizes are "tailor made" without extra cost.

■ A complete line of direct-fired unit heaters for hand or stoker-fired gas, oil or coal fuels has been announced by Airtherm Mfg. Co., St. Louis. This self-contained unit, known as Directherm, is said to be an ideal heater for buildings that are heated intermittently or isolated buildings to which it is impractical to pipe steam.

Unit is said to have a minimum number of parts, high combustion chamber efficiency, comparatively low outlet temperatures and a hor-

izontal, high velocity air stream with adjustable wide angle of delivery. Multi-blade centrifugal fan distributes warm air throughout area to be heated and eliminates need for duct work to provide uniform heating.

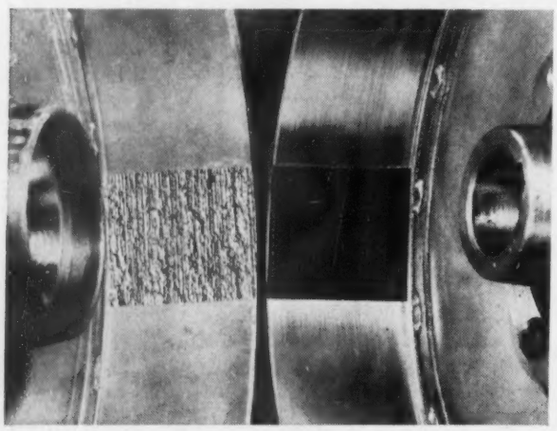
■ Injection molding of more difficult plastic parts is made possible by a new line of Lester-designed automatic injection molding machines recently placed on the market by Index Machinery Corp., Cincinnati. Heavy cast steel beams across the top and bottom of this machine replace conventional tie bars and insure rigid locking of the molds.

Molds are opened and closed by hydraulic power. Force of injection is transmitted directly through heavy toggle links to the rigid back plate of machine. Adjustment of the movable die plate is by means of a heavy forged manganese steel screw, driven by a worm and worm wheel. A sleeve type heating cylinder is used, and the temperature of the material is automatically controlled. Machines are built in standard 4, 6 and 8-ounce capacities.

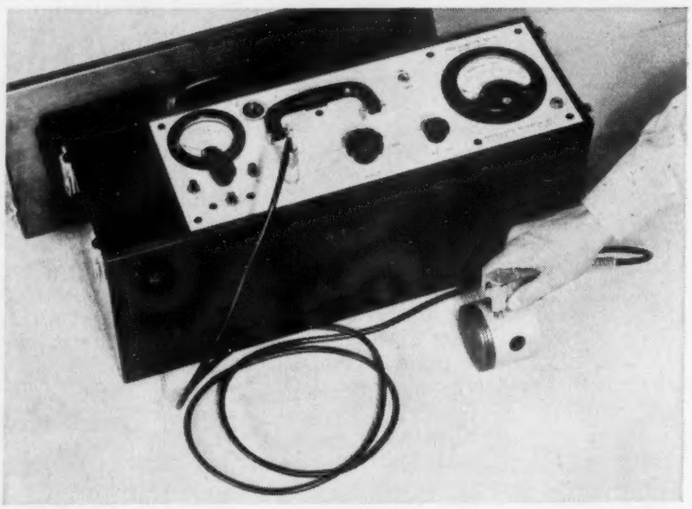
What about the new finishes

ALL industry is interested in the new method of producing superfine finishes on metal. Finishes so nearly perfect that moving parts such as bearings, cylinders, pistons and cams are made literally *wear proof!*

Using special abrasive stones such as the Carborundum-made stones shown on next page, this new process is both economical and rapid. Production of an almost perfect finish seldom takes over 30 seconds.

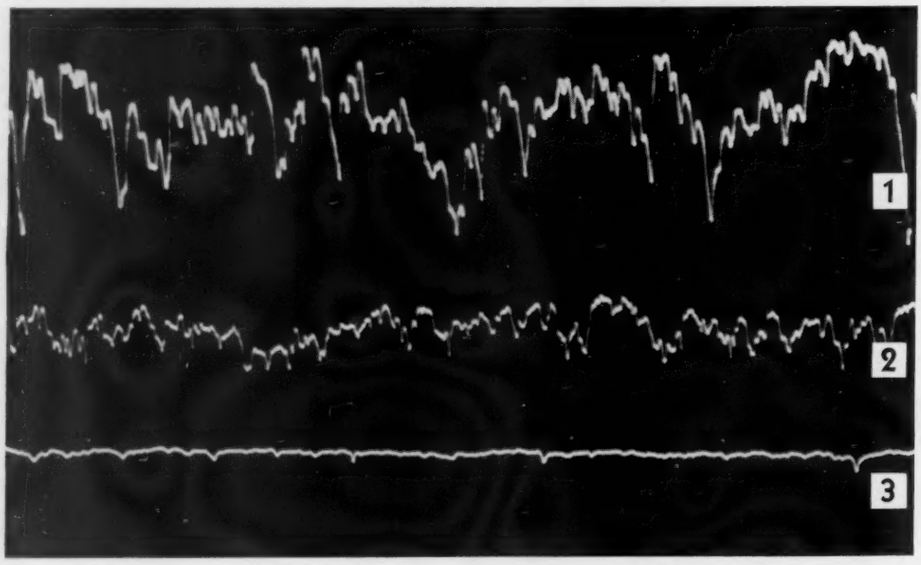


YES, BOTH ARE BRAKE DRUMS. *The center section of each drum is an enlargement to show surface characteristics. The drum on the right has a Chrysler "Superfinish" which gives smooth soft pedal action. Compare with ordinary brake drum surface on the left!*



MILLIONTHS OF AN INCH (microinch) ARE EASY *to measure with the new Profilometer. This new scientific instrument was developed for the speedy measurement and comparison of surface irregularities.*

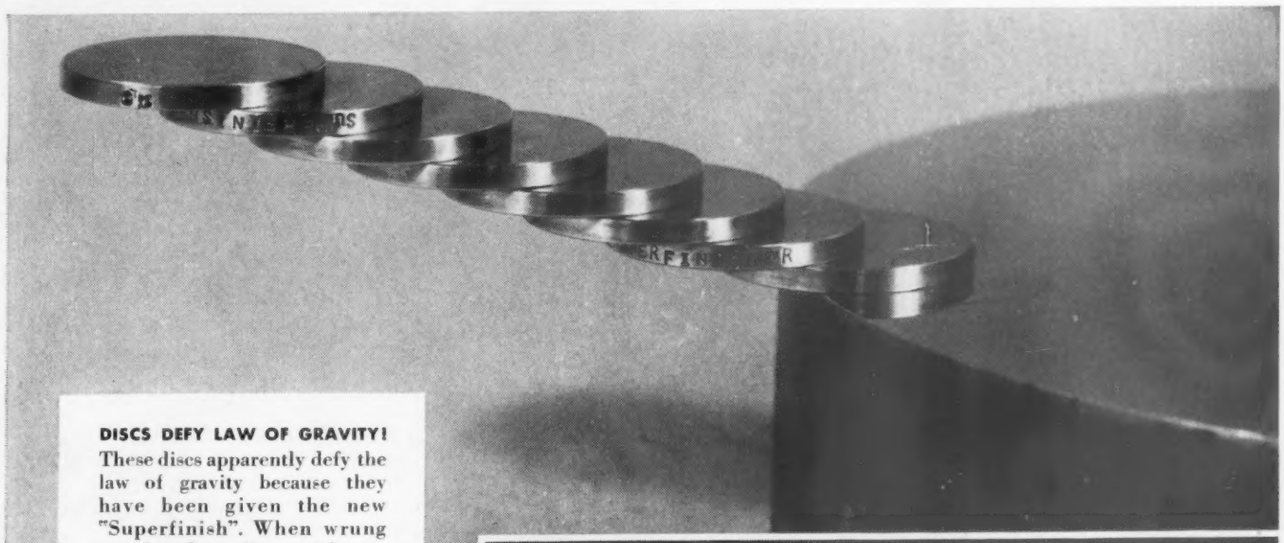
Production of the new wear proof finishes requires the use of abrasive stones that are carefully manufactured and uniformly of the correct grain, grit or grade. For this reason, users of the new process have turned to The Carborundum Company, because of its years of experience in the manufacture of the highest quality abrasive products. The production of superfine wear proof finishes is one place where you cannot take chances with ordinary or inferior abrasives.



STARTLING COMPARISON!

Profilograph No. 1 shows you the surface of a wrist pin that has been rough ground. Average roughness as determined by the root—mean—square method is 20 millionths of an inch. No. 2 shows a pin after finish grinding: Average roughness is 6.9 millionths of an inch. Profilograph No. 3 represents the surface of a pin that has been given the new wear proof finish. An average roughness of only 1 millionth of an inch reduces wear to the vanishing point. (In each case the magnification is 10,000 vertical and 100 horizontal.)

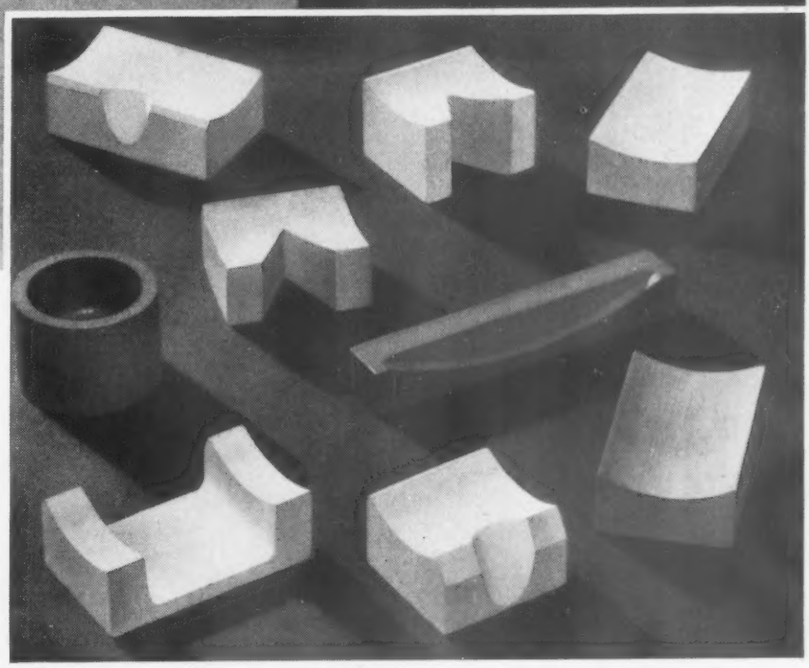
for wear proof surfaces?



DISCS DEFY LAW OF GRAVITY! These discs apparently defy the law of gravity because they have been given the new "Superfinish". When wrung together they adhere with considerable force, because of their optically flat surfaces. Tests show that machine parts with surfaces similar to this give perfect lubrication, are practically immune to wear.

Carborundum engineers are well abreast of all new finishing developments and are in a position to tell you frankly and fairly their various advantages. If you are one of the thousands of manufacturers who are looking forward to increasing sales and profits with this new process, we invite you to get in touch with us. The Carborundum Company is equipped to manufacture all varieties of abrasive stones and wheels employed in these processes and can supply samples for test work.

CARBORUNDUM
REG. U. S. BRAND PAT. OFF.
ABRASIVE PRODUCTS

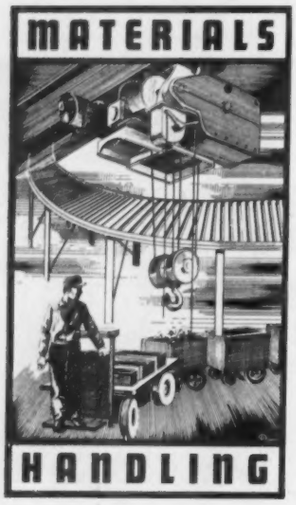


ABRASIVE BLOCKS SUCH AS THESE *play an important part in the production of wear proof finishes. The blocks must be accurate, uniform and of exactly the right grade, grit and bond. You know that every block will be right if it is manufactured by Carborundum. The blocks and wheels illustrated are only a few of the many shapes and sizes necessary for the production of various wear proof finishes. Each particular job requires special shapes and abrasive specifications.*

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.
REG. U. S. PAT. OFF.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum is a registered trade-mark of The Carborundum Company)



New Charging Setup

Located in the tin mill at Irvin works, this compact charging station is designed to service three sizes of batteries for a full fleet of 15 fork type electric trucks and three general duty trucks

Electric hoist equipped with a special lifting rig is used in removing discharged batteries and replacing them with freshly charged units

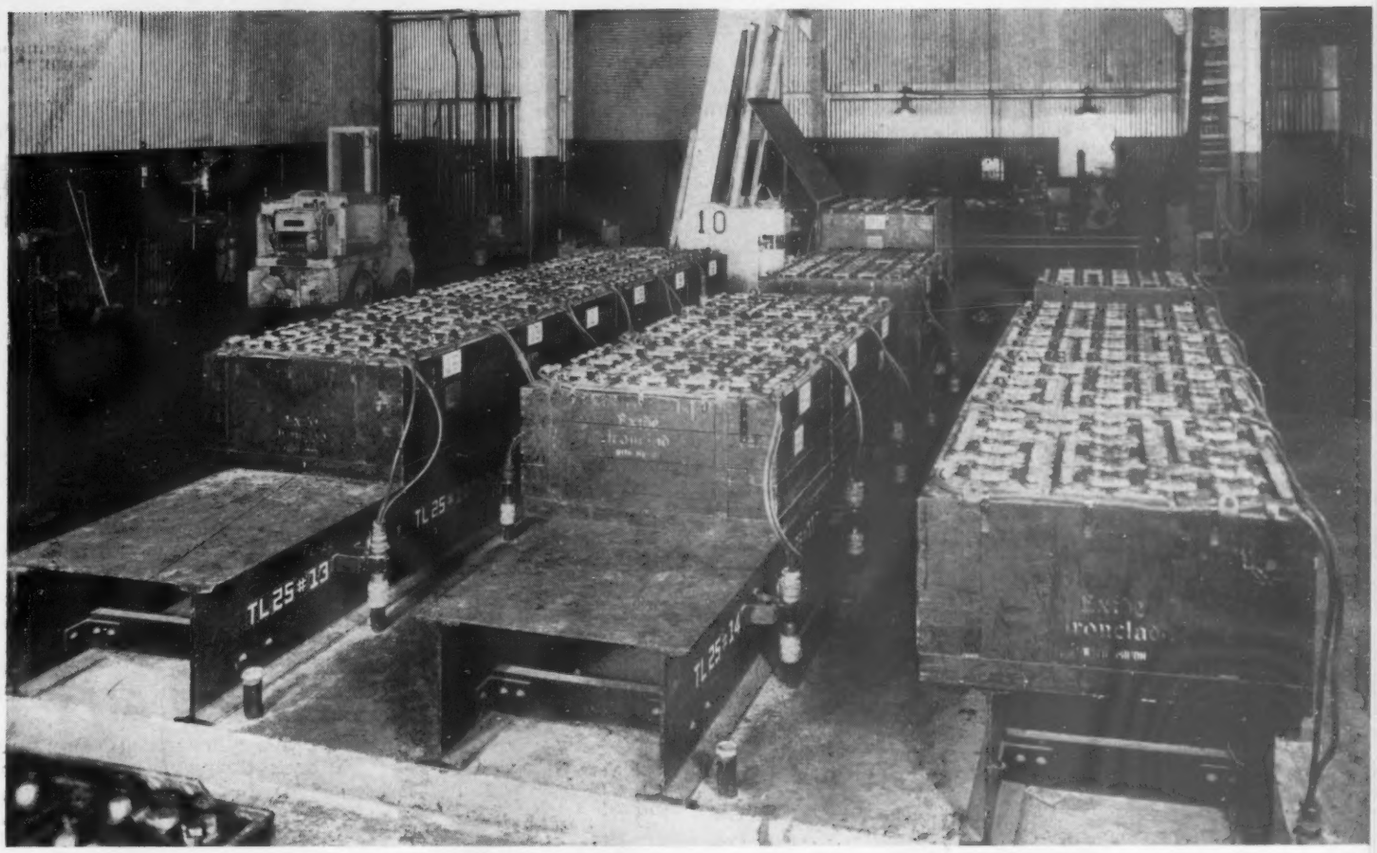
■ ALTHOUGH fleets of battery-operated industrial trucks have been in operation in industrial plants of all kinds for many years, there has been little study done on efficient layouts for recharging departments for industrial truck batteries. It has usually been a case of pointing a finger in some remote corner and saying "put the charger there."

In installing a charging setup for the batteries from trucks used at the Irvin works, Carnegie-Illinois Steel Corp. studied installations in other manufacturing plants, asked for suggestions from battery and truck manufacturers and added material from its own experiences. Net result of this work is seen in the battery charging room at Irvin works, one of the most efficient layouts installed to date.

Has Adequate Capacity

This station, located in the tin mill, services fifteen fork type electric industrial trucks, used in handling tin plate in production, and three general duty trucks. Before starting the design, it was determined that the average truck required 2.4 charges during a 42-hour day, with the result that 43 batteries are required to maintain constant operation. Consequently, the station has been designed to take care of 50 batteries. The types used are 36-volt with 21, 25 and 29 plates.

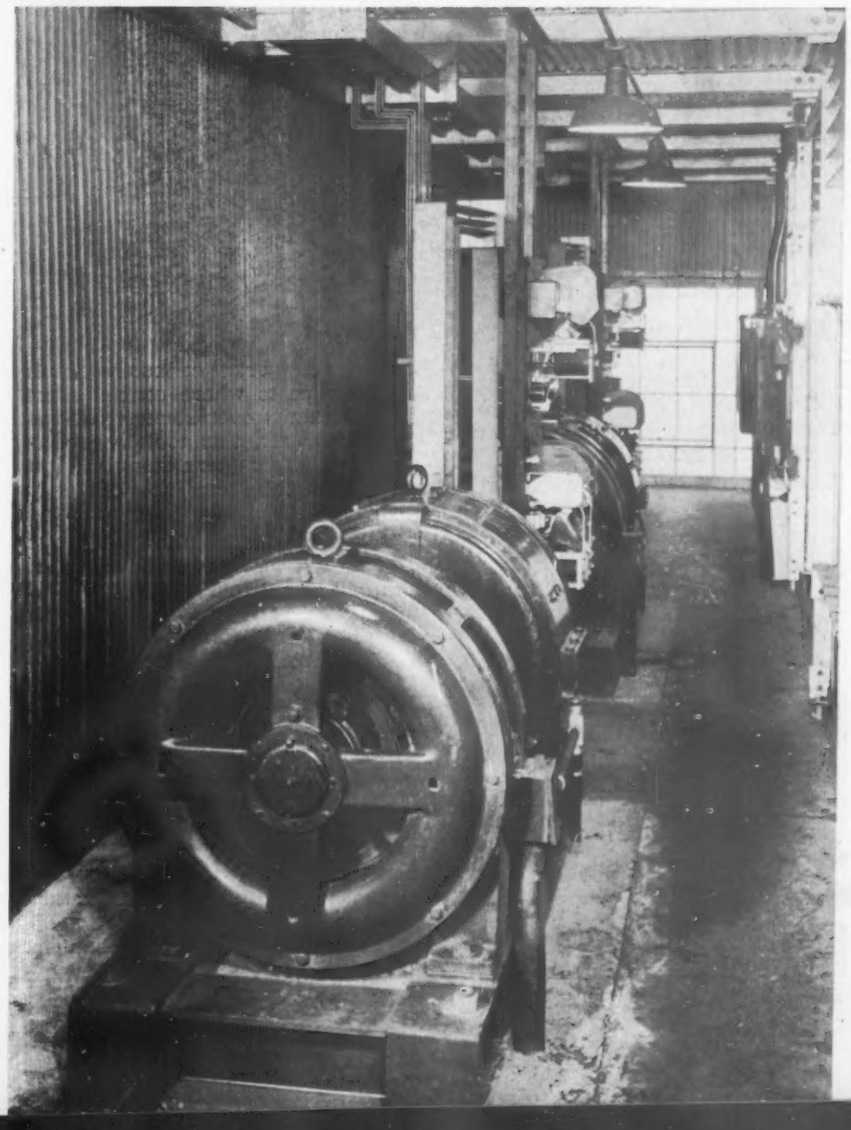
One of the important features of the layout is attempt made to con-



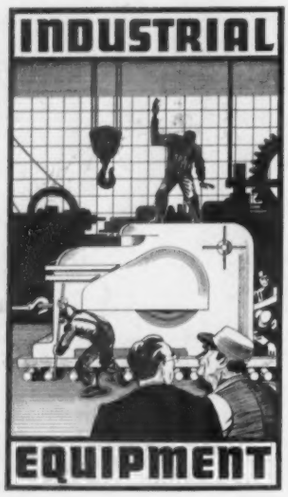
serve floor space. Motor generator sets which supply current to the chargers, as well as the alternating current linestarters, are mounted on a covered runway on an upper level, out of the way and off the floor. Directly below the runway are the charger control panels. In order to mount these panels closer to the backwall, the resistors have been moved from the usual position behind the boards to a mounting on top of the panels. Leads from the panels to the batteries being charged are imbedded in the concrete floor and emerge in sturdy plugs, one below each of the 50 locations provided for charging batteries.

General layout of the charging floor provides two sets of three steel tables, each with a truck aisle at the end. These tables are mounted on concrete slabs 6 inches above the floor level, and the tables themselves

(*Please turn to Page* 67)



(Below) Motor generator sets, with supply current for the charging operation, are placed in the runway shown here, set on an upper level above the control panels. (Above) End view of battery tables, showing location of floor plugs. A section of the control panel is visible at right with runway housing motor generator sets above it. In the rear is a machine shop for repairing trucks and a service station for gasoline powered trucks



Electric Strip Heaters Are Completely Enclosed

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced two new types of strip heaters, in temperature ratings of 750 and 1200 degrees Fahr., designed to produce fast, economical heat in such applications as crane cabs, elevators, ovens, metal water tanks, pipe lines, hot tables, metal molds, foundry platens, etc.

Heaters may be obtained either with both terminals at one end or at opposite ends for installation convenience. Heating elements, with refractory insulation and sealed against moisture, are completely enclosed. Bolt holes are provided at each end. Available for operation on 115, 230 and 250 volts, heaters include lengths of 8, 12, 18, 24, 30½, 36 and 43 inches with ratings from 150 to 1250 watts.

Protects Workers' Shins

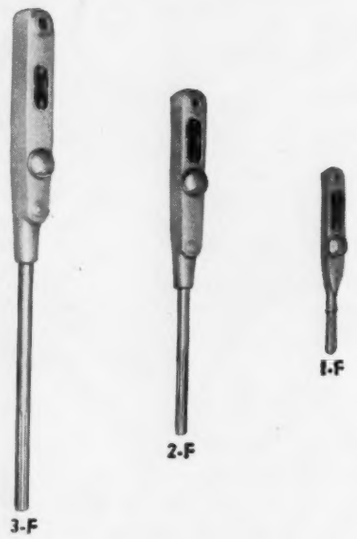
■ Ellwood Safety Appliance Co., Ellwood City, Pa., has introduced a new type of shin guard for the protection of workers' legs in industrial locations where such a safety measure is necessary.

These guards may be worn with comfort either inside or outside clothing. Each individual fibre protector is formed to the contour of the human leg. Three horizontal ribs add strength and rigidity. Four brass eyelets accommodate straps for attaching the guard in position. At top and bottom molded rubber pads act as a shock absorbing device.

Wrench Provides Uniform Tension in Bolting Jobs

■ Automotive Maintenance Machinery Co., 2100 Commonwealth avenue, Chicago, has introduced an improved type of tension indicating wrench, designed to tighten bolts to a predetermined stress, with each bolt carrying its proportionate share of the designated load.

In bolting or tightening cylinder heads, flange connections, main bearing supports, connecting rods or other parts where control must be maintained over steam, gas, water, oil or air, this tool is said to provide uniform tensioning so that stress on bolts can be definitetly known.

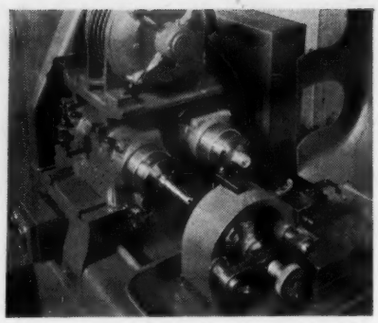


Wrench is available in three sizes: 1-F, 2-F and 3-F. These have capacities of from 0 to 175, 420 and 1000 foot pounds and are equipped with ½-inch, ¾-inch and 1-inch square work adapters, respectively.

Spindle Retracts Tool From Contact with Work

■ Ex-Cell-O Corp., 1200 Oakman boulevard, Detroit, has devised a precision boring spindle which automatically retracts the tool from contact with the work on its return stroke. This retracting action is obtained through a simple mechanism.

Spindle proper is hollow with a shaft slidable endwise within it. Tool carrying quill on end of the spindle is assembled in such a manner that it is free to move at right angles to the spindle axis in the plane of the cutting tool axis. Within the quill are machined two opposed hollow tapers, one concentric with the lengthwise axis of the quill, while the opposed taper is machined a small amount off-center. At the machine end of the spindle is a hydraulic cylinder which moves the central shaft endwise a small amount in the spindle.

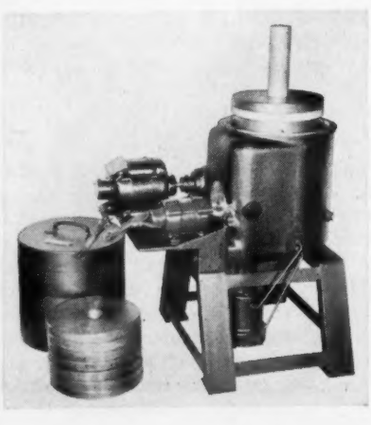


When this cylinder and piston pull shaft back through the spindle, a tapered portion on quill end of the shaft engages rear taper in the quill. When cylinder pushes shaft forward through the spindle, shaft leaves the taper and engages the reverse off-center taper toward front of the quill. This engaging action results in moving quill off-center at right angles to the spindle axis, retracting tool from the work.

Measures High Pressures With Extreme Accuracy

■ Bailey Meter Co., 1050 Ivanhoe road, Cleveland, has devised a power type pressure gage for measurement of high pressures to an accuracy of 0.1 per cent of the reading. Pressure measured is indicated on a scale, or readings may be transmitted to recorders located at distant points.

Pressure is applied to a small piston which supports a pilot valve and a table loaded with removable

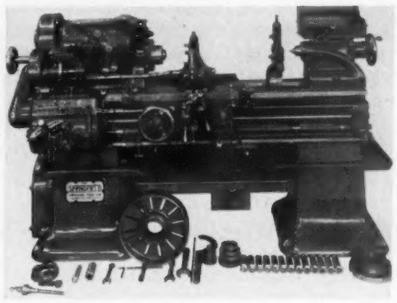


weights. This portion of the device is rotated continuously to eliminate static friction. A small motor serves to rotate pressure piston and pilot valve, and a ball bearing is provided so that weights and weight platform need not rotate. This motor also drives pump which provides hydraulic pressure for operation of the power piston, which in turn moves the mercury cup, the indicating pointer and the Selsyn motor for electrical transmission of readings.

For each pressure applied to the small rotating pressure piston, a definite position of the power piston, mercury cup and indicating pointer is obtained. Unit illustrated was designed for a maximum range of 10,000 to 12,000 pounds per square inch.

New Toolroom Lathe Employs Metric System

■ Springfield Machine Tool Co., Southern avenue, Springfield, O., has placed on the market a metric system toolroom lathe with ball



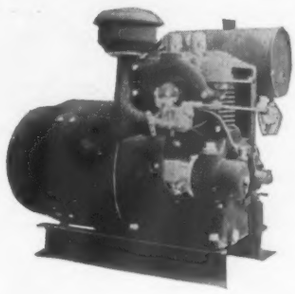
bearing geared head and 12 changes of speed. Lead screw and all measuring screws are designed to produce metric measurements. Machine is equipped for full toolroom requirements, including a relieving attachment, taper attachment, draw-in collet attachment, and oil pan.

A unique thread chasing dial indicates to operator the proper time to insert halfnuts to produce any of the metric threads listed on the operating chart. This method is very simple; the threads in each column of the gear box direct reading index plate can be chased with the same dial. There is a dial for each column of threads.

Gasoline Engine Drives Aircooled Generator

■ Kato Engineering Co., Mankato, Minn., has added to its line a two-cylinder, aircooled, 2000-watt, alternating current plant for generating standard 110-volt, 60-cycle current.

Unit is self-excited and can be furnished with remote control or full automatic control. Engine has a sensitive governor, giving close voltage regulation. High tension magneto, sparkplugs and wires are



completely shielded. The direct current winding has been designed especially to keep commutator ripple to an unusually low point. Engine is available with either 2½-gallon gravity tank or with fuel pump. Complete unit is 28 inches long, 18 inches wide and 23 inches high.

This generator can be applied to operate drills and other electric machines in locations where there is no alternating current available.

Seal Protects Bearing From Leakage and Dirt

■ SKF Industries Inc., Front street & Erie avenue, Philadelphia, has devised a patented triple seal which is said to protect bearings effectively against lubricant leakage, dust, dirt and moisture.

This seal consists of two split piston rings on each side of the housing, grooved on the outside diameter to form a labyrinth seal with the two end bores of the housing. Each ring has an inward tension that enables it to turn with the shaft. Seals are free to locate themselves axially whenever shaft expansion occurs.

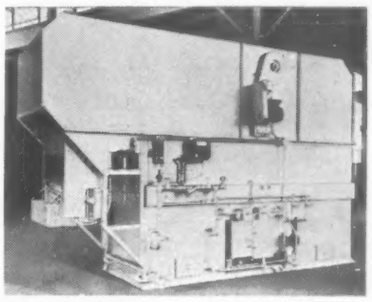
On either side of the housing two rings are mounted on the shaft with the splits 180 degrees apart to prevent lubricant leakage. Inner ring serves as an internal flinger, and the outer ring keeps dirt and other foreign matter from entering the housing.

This seal is made for the complete range of standard shaft sizes and is designed for split housings which are machined to allow axial freedom of the bearing.

Employs Boiling Solvent To Degrease Metal Parts

■ Detroit Rex Products Co., 13011 Hillview avenue, Detroit, has developed a machine for removing oil, grease and dirt from stampings, castings and screw machine products prior to painting, plating, inspection and heat treating.

In operation, work is first immersed in boiling solvent, then in clean solvent rinse and is finally cleaned and dried in pure solvent vapors. At normal conveyor speed of 6 feet per minute, this degreaser has a rated production cleaning capacity of 2000 pounds of work per hour. Unit has a return-type cross-



rod conveyor, designed to load and unload at one end. Machine is built in several sizes. Unit shown accommodates work up to 36 inches long by 15 inches wide by 15 inches deep. Approximate overall dimensions of degreaser are: Length, 12 feet; width, 6½ feet; height, 10 feet.

Machine is fabricated from steel plate, reinforced with structural steel, and is of all-welded construction. Inside is hot zinc spray coated after fabrication.

Riveter Operates from Standard Shop Air Line

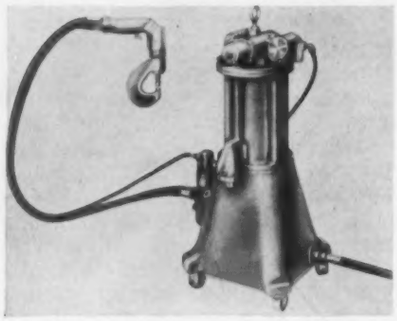
■ Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, has introduced its new Liteweight Pneudraulic riveter, designed to increase production by decreasing operator fatigue.

Machine will handle any application requiring full head Dural riveting up to ¼-inch, or full head soft iron riveting up to 3/16-inch. It is particularly well adapted to the fabrication of airplanes, bus bodies, lightweight railway coaches and similar aluminum assembly jobs.

Power plant is compact, self-

contained and fully automatic, with nothing to adjust except one thumb wheel for changing riveting capacity. Two riveters can be attached to one power plant, if used alternately. A unique method of attaching yokes to power cylinder gives yoke a full swivel of 360 degrees.

Machine is operated entirely by



compressed air. No special air lines are necessary, as unit may be connected to any standard shop line furnishing 90 to 100 pounds pressure.

New Current Collector

■ Ohio Brass Co., Mansfield, O., has announced a current collector for use with heavy duty trolleys in mines and industrial plants.

Known as the type F mine shoe and harp, this device provides an alloy steel shoe or glider and a one-piece malleable iron harp casting. Shoe is especially designed for heavy currents and offers 3 inches of wire contact surface. Pivotal center of the shoe is in the center line of the wearing surface, eliminating any

tendency to tilt because of friction. An extra-size shunt completes the assembly.

Adds Electric Drills

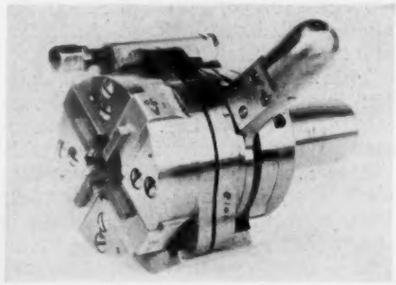
■ Stanley Electric Tool division, The Stanley Works, New Britain, Conn., has brought out two Victor portable electric drills, Nos. 581 and 341, for use by contractors, mechanics and maintenance men.

Both drills have nickel steel gears, combination breast plate and spade handle, and pipe handle which is detachable for close work. No. 581 has a chuck capacity of ⅝-inch and No.

341 has a chuck capacity of ¾-inch. Both are equipped with compact, sturdy, reserve power universal motors.

Insert Chaser Die Head Has Detachable Shank

■ Eastern Machine Screw Corp., New Haven, Conn., has developed a new style of chaser die head for use on hand screw machines and turret lathes, size 103 having a range from ¼-inch up to 1¼ inches in long threads and up to 1½ inches diam-



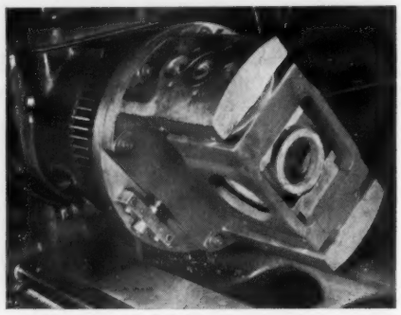
eter in short threads. All three sizes, 101, 102 and 103, use the same insert chasers as other styles.

Drive is by strong torque arms located a maximum distance from the center. Head may be tripped either by pulloff or by front-end contact, the latter being desirable for close-to-shoulder threading or for cutting short threads. Fine adjustment for length of thread is self-contained on the head itself. Shank is detachable and can be furnished in any reasonable diameter.

Fixture Aids Machining Of Valves and Fittings

■ Gisholt Machine Co., Madison, Wis., has developed a seven-position turret lathe fixture for accurately machining gate valves and pipe fitting in one chucking.

Seven positions provided for are 0, 45, 90, 180 and 270 degrees and two positions approximately 3 degrees off center. Fixture has a capacity of 2 to 5-inch valves and pipe fittings; by use of special jaws or a special cradle, fixture may be arranged for holding different size

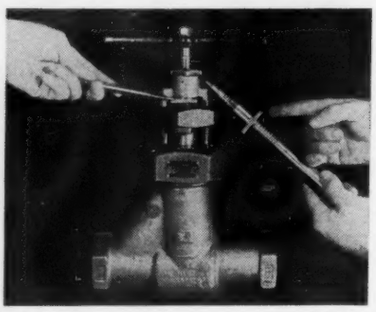


flange pipe fittings or flange valve bodies.

Work is chucked simply by turning a wrench at bottom of the fixture which opens and closes the jaws. Castings are automatically located on center in hardened steel locating pins which hold them securely. Fixture is heavily constructed of cast steel to insure rigidity. It bolts directly to the flanged spindle nose of a heavy duty turret lathe.

Aluminum Copper Silicon Alloy Used for Bushing

■ Hancock Valve division of Manning, Maxwell & Moore Inc., Bridgeport, Conn., has improved its line of



forged and cast steel valves by redesigning the renewable stem thread bushing used in these valves.

This bushing is now made of Doronze, an alloy of aluminum, copper and silicon. It is said to have an exceptionally low coefficient of friction, a high resistance to wear and corrosion, plus a tensile strength of 90,000 pounds per square inch. Should it become necessary, this bushing can be replaced economically, thus saving the cost of a new valve stem and bonnet.

New Charging Setup

(*Concluded from Page* 63)

are 18 inches high. They are constructed of steel plates mounted atop twin I-beams. The height is such that a minimum of lifting is necessary to remove a battery from a truck and place it on the tables, or vice versa. It is also easy for a workman to take readings of the batteries and check the charges when necessary.

Since there are three sizes of batteries used, each of the three tables in each section is built to fit one size battery; one for 21-plate batteries, one for 25-plate batteries, and one for 29-plate batteries. Charging panels are likewise equipped to handle batteries of various sizes.

An overhead power lift equipped with a special lifting rig handles the batteries in and out of trucks. The rig is equipped with four chains and hooks, which fit into four metal lugs on the batteries, making for ease and speed in handling.

Floor plugs supplying current for recharging the batteries are built so the cables leading from the battery will fit without an excess of length. The same cables fit the truck terminals with little or no extra length to buckle and wear.

In order to design the charging station efficiently, company engineers obtained the co-operation of various manufacturers of trucks, batteries and electrical equipment. Interchangeability of plugs, sockets and connections was required, as well as standardization on size, length of cables on the batteries and location of terminals on trucks. This standardization has made it possible to do away with extra connectors, adaptors and similar equipment which often proves a trouble spot both in the charging station and on the trucks.

♦

Continuous Spinning

(*Concluded from Page* 58)

processing and handling economies, improvement in quality and uniformity of product, this machine were in time applied to the entire viscose rayon industry, the approximate saving on first installation cost would be: 240,000,000 (estimated pounds per year production) x 3.1c or $7,440,000.00.

Until the large scale, commercial operation of the plant at Painesville has had a reasonable length of time to demonstrate its performance, no accurate evaluation of the increased quality, efficiency and economy possible with this process can be made. However, all possible cost objections to superimposing the processing units into the composite structure described have been eliminated by the economy and simplicity of the welded frame.

The continuous spinning machines required a total of 570,000 pounds of aluminum for window frames and casings, 1,200,000 pounds of lead for the acid tanks and piping and 2775 tons of steel for the structural members.

In addition, other portions of the plant took much steel and metal. Building itself employs 6500 tons of structural and reinforcing steel; 77,000 square feet of steel grating (77 tons) are used on various structures; there are 11 miles of aluminum flashing on roof and monitors. Roughly 50 miles of metal pipe, ranging from ⅛ to 48 inches in diameter, are installed. Piping includes steel, wrought iron, copper, brass, graphite, Inconel, cast iron, crock or ceramic, aluminum and lead. In piping and an evaporator, amount of lead used totaled 340,000 pounds. The water intake line from Lake Erie required 550 tons of 48-inch pipe.

A large number of all-welded steel tanks is employed, ranging from 3000 to 25,000 gallons in capacity and taking over 1000 tons of steel for their construction. All these figures are in addition to the power house equipment and processing machinery used in the plant—except the spinning machines which took the quantities noted.

Other interesting features of the Painesville plant include a complete water filtering and purifying system and a modern power plant adequate to meet the residential needs of a city of 450,000 population. Fifteen million gallons of water are pumped daily. Three boilers generate a total of 270,000 pounds of steam per hour to operate three turbo-generators with a total rating of 15,000 kilowatts. A huge air-conditioning system requires 1500 tons of refrigeration. An additional 300 tons of refrigeration are supplied for processing. Insulation throughout the building is facilitated by use of glass block for window sections except in the office structure. The air-conditioning system functions in many separate zones, each thermostatically controlled to maintain temperature and relative humidity within the narrow range best suited for the particular process in the area served.

Arrangement of processing equipment and routing has been designed to take maximum advantage of gravity flow throughout all stages of the operations. Chemicals go direct from tank cars to storage tanks on upper floor of the 3-story chemical building. Dry materials also are stored on this floor. Materials work down from third and second floor to process storage tanks in the basement from which they are forced by air pressure up to the continuous spinning machines on the first floor.

♦

Presents Discussion of Metal Cutting Physics

■ The story of "what happens in metal cutting" is presented in a reprint of a lecture given by Hans Ernst, director of research, Cincinnati Milling Machine and Cincinnati Grinders Inc., under the

auspices of the American Society for Metals at the National Metal congress, Detroit. This paper, entitled "Physics of Metal Cutting," describes chip formation under various conditions and explains certain metallurgical and machine operating factors with the aid of photomicrographs. Mr. Ernst outlines studies made to determine stress distribution in metal ahead of the tool point by means of the photoelastic method. Copies of this reprint may be obtained from Cincinnati Milling Machine and Cincinnati Grinders Inc., Cincinnati.

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Composite Metals

(*Concluded from Page* 41)

heating cost may vary from $2 to $5 per ton.

The out-of-pocket cost of material, heat, power and labor to obtain a 20 per cent cladding of 18-8 on low carbon steel and hot rolling is of the order of $104 per ton of composite. Cost of making the alloy on the surface of the slab is approximately 15c per pound for 18 per cent chromium and 8 per cent nickel. Of the total of 15c per pound for this alloy, approximately 8c is for ferrochrome and nickel shot; the remainder being the cost of operating the process. The 18-8 metal being the most expensive ordinarily used represents the highest costs.

Costs of processing the composite beyond hot rolling depend largely on what is required. Pickling, grit blasting, cold reduction, polishing or other operations may be carried out at usual costs for these operations.

The process may be used by a steel plant not equipped with an electric furnace and trained personnel to produce solid stainless steel.

Since both the thickness of the slab worked on and the thickness of the alloy applied may be varied, the process is adaptable to the production of composite metals having a thin coating of alloy. Perfection of the modern cold reduction process has opened up possibilities of a composite made of low carbon steel with a thin coating of perhaps 17 per cent chromium on one or both sides.

Tin plate with as much as 40 pounds of tin per ton is a high grade product but it seems quite likely that the same steel with 40 pounds per ton of 17 per cent chromium on the surface would offer longer life and better corrosion resistance.

The same conditions apply to a comparison with galvanized steel. With an out-of-pocket cost of applying 17 per cent chromium of the order of 10c per pound and an extra cost for grit blasting or belt grinding before pickling where the cladding is applied to only one side, the cost of the composite is still comparable to the cost of tin plate.

♦

Cite Welding Benefits From Improved Controls

(*Concluded from Page* 43)

with light heads require less spring pressure to produce a good weld than do welders with heavy heads under otherwise similar conditions. Inertia of the heavier head prevents it from "following in" when the work has become plastic and deforms readily. Unless the spring pressure is rather large, the pressure actually applied to the high temperature region may be insufficient to forge the materials together. Accurate control of electrode contact area is necessary to secure consistently good welds with a given transformer tap and conduction period.

Cost of many welding operations performed on machines not equipped with precision control could be reduced by installing proper control, according to F. H. Roby, Square D Co., Milwaukee, in discussing simplified precision resistance welder control. Furthermore, numerous parts now fabricated by other methods could be welded. Relative complexity and high initial cost has operated against a greater employment of such control apparatus.

Mr. Roby told of a company manufacturing small circuit breaker parts finding it necessary to fasten contacts composed of silver alloy material to bronze connectors. Copper to copper and copper to bi-metal joints were also included in the assembly. A motor-driven welding machine with one of the better nonsynchronous control units was used and because of the critical nature of the operation and rigid inspection requirements, rejections were as high as 23 per cent. Installation of a simplified synchronous control unit brought rejects down to less than 1 per cent with none attributable to welding defects.

Simplified form of precision control, consisting of a synchronized magnetic contactor and motor-driven timer, overcome most borderline objections, Mr. Roby claims. While numerous types of spot weld timers have been developed in the last two years, practically all belong to a group characterized by a series of magnetic relays operated in conjunction with one or more time delay units of the electromagnetic, electrostatic, or mechanical types. A magnetic contactor of considerable size to make and break the circuit to the primary of the welder transformer usually is required.

For all applications where extreme accuracy is not required, relative simplicity and low initial cost have prompted use of nonsynchronous devices. Errors equivalent to at least a plus or minus one half cycle of current are frequent, although the actual timing period is perfectly metered and operating limitations are well known. Such errors result, said Mr. Roby, from inconsistent operation of standard alternating-current magnetic conductors and relays; also more serious discrepancies introduced by failure to synchronously close and open the power line leading to the welder transformer.

Control Features

Features of control equipment responsible for improved performance include: Special magnetic contactor consisting of two separately actuated poles operated in sequence, the circuit closing pole being adjusted to take advantage of natural response characteristic of contactor and the circuit opening pole self-synchronized to open at the minimum arcing independent of timer setting; motor-driven timer with a continuous running motor, but without a mechanical clutch; means for selecting the stable operating points of the magnetic contactors as well as determining the actual welding time and consistency.

Alternating current has become the steam shovel of welding, according to C. J. Holslag, Electric Arc Cutting & Welding Co., Newark, N. J., who described alternating-current arc processes. In recent years, he said, much important work, including Class 1 pressure vessels, oil-fired vessels, penstocks, etc., have been fabricated by these processses which have definite advantages of speed, low cost and high-grade deposits.

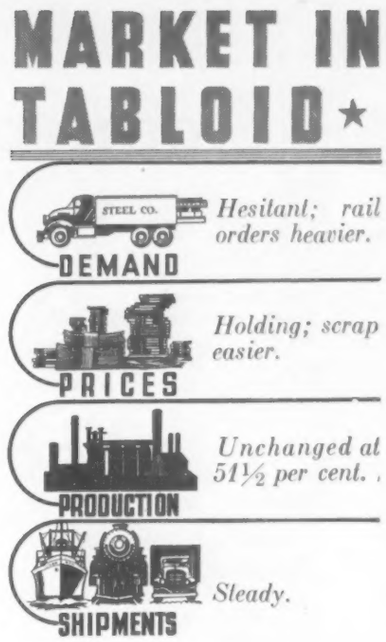
♦

Specifications for Track Systems Issued

■ A new edition of Specifications for Overhead Track Systems has been released by Monorail Manufacturers association, 165 Broadway, New York. Specifications are detailed under the following heads: (1) Extent of Work, (2) Track, (3) Suspension Fittings, (4) Manually Operated Trolleys or Carriers, (5) Switches, (6) Cranes and Transfer Bridges, (7) Track Openers or Liftout Links, (8) Electrification, (9) Collector Wheels or Shoes, (10) Electric Hoists, (11) Electric Hoist and Travel Carriers, (12) Wiring, and (13) Guarantee. Copies may be obtained by addressing the association.

Sidewise Trend In Markets Continues

Activity In Building Steel And Rails Outstanding



■ STEEL demand, slow to gather momentum, is receiving better support from railroads, while building and engineering construction continues a major outlet for heavy products.

Buying elsewhere is somewhat hesitant. This situation is seen as only temporary, however, since consumption generally is steady or rising slightly. Absence of major changes in specifications is reflected in slight variations in steelmaking since the initial post-holiday recovery. Operations last week were unchanged at 51.5 per cent.

So far this month, nothing has developed to alter expectations of a moderate upturn in steel production later this quarter. Because of surplus stocks at the opening of the year, some consumers have deferred new buying of sheets and strip. Mills have reduced heavy backlogs accumulated in these products last quarter, and quiet in new ordering is tending to curtail output.

Influence of prices on purchases was slight prior to recent circulation of a report that the structure had weakened. Despite absence of confirmation, and vigorous denials by producers, this rumor has contributed to buyer hesitancy. Chronic weakness still prevails in some products, principally in resale markets, but quotations on most commodities are steady.

Rail Orders Exceed 151,000 Tons; Equipment Buying Slow

Rails ordered last week totaled more than 151,000 tons. Backlog of one producer already is in excess of its total 1938 production, but since shipment will be spread over several months, immediate effect of recent orders on operations will be moderate.

Latest purchases include 25,000 tons for Southern Railway, 40,472 tons for Southern Pacific, 6000 tons for Soo Line, 5200 tons for Seaboard Air Line, in addition to 8000 tons placed previously, and 74,214 for Union Pacific.

Railroad equipment buying is quiet. Several thousand freight cars remain pending and repair work is slightly more active, but conservatism still dominates expenditures by the carriers.

Structural shape awards and inquiries are lighter, as the contracting phase of the public works program is waning, but large tonnages are to be shipped against previous orders. Reinforcing bar orders were bolstered sharply last week by the placing of 14,000 tons for an aqueduct in the Boston district. For the same work 16,000 tons of sheets and 5000 tons of plates were awarded. Structural bookings include 6550 tons for the Delaware aqueduct, New York.

Automobile production remains unusually heavy, all factors considered. Last week's output of 89,200 was a decrease of only about 1000 units and left assemblies more than 50 per cent larger than a year ago. A January total almost equal to that of the corresponding 1936 month is indicated. Seasonal slackening is seen for February, although heavier orders for steel are in prospect.

Tin Plate Makers See 25 Per Cent Rise in 1939 Production

An upturn in tin plate production, currently about 45 per cent of capacity, is looked for shortly, since heavier buying for can requirements of food packers is due. Expressions at last week's canners' convention point to a 25 per cent increase in tin plate output this year.

Operations at most steelmaking centers were unchanged last week. Pittsburgh increased 1 points to 46 per cent and Cleveland was up 1 point to 60. On the other hand, Chicago was down 2.5 points to 45.5, Youngstown dropped 7 points to 45 and Cincinnati was off 3 points to 52. Indicative of wide variation in activity of different steel products, three Chicago mills are operating at better than any rate attained in 1938, while two plants are at the lowest level since last summer.

Steady schedules continued in other districts, including eastern Pennsylvania at 34, Wheeling at 64, Buffalo at 44, Birmingham at 77, New England at 70, St. Louis at 40 and Detroit at 88.

Scrap is more active on mill purchases at Chicago and Pittsburgh, but a 50-cent reduction in heavy melting steel in the latter market lowers the scrap composite 8 cents to $14.71. The finished steel composite continues $56.50.

COMPOSITE MARKET AVERAGES

	Jan. 28	Jan. 21	Jan. 14	One Month Ago Dec., 1938	Three Months Ago Oct., 1938	One Year Ago Jan., 1938	Five Years Ago Jan., 1934
Iron and Steel	$36.35	$36.37	$36.37	$36.36	$36.48	$38.95	$31.15
Finished Steel	56.50	56.50	56.50	56.50	57.04	61.70	51.10
Steelworks Scrap..	14.71	14.79	14.79	14.77	14.00	13.85	11.24

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Jan. 28, 1939	Dec. 1938	Oct. 1938	Jan. 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.10	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.15	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.10	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.15	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to 9/32-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Jan. 28, 1939	Dec. 1938	Oct. 1938	Jan. 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.26
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.27	97.77	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.25	$15.50	$14.95	$14.05
Heavy melt. steel, No. 2, E. Pa.	13.25	13.20	12.95	13.75
Heavy melting steel, Chicago	13.75	13.85	13.05	13.25
Rails for rolling, Chicago	17.75	17.75	16.25	14.90
Railroad steel specialties, Chicago	16.00	16.05	15.55	15.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.25
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c
Iron	
Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c
Reinforcing	
New billet, straight lengths, quoted by distributors	
Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c
Rail steel, straight lengths, quoted by distributors	
Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45
(Per pound)	
Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00
To Manufacturing Trade	
Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)	
Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c
Worcester, Mass., $2 higher on bright basic and spring wire.	
Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 150-	
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00
Cents per pound	
Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	65-5	70
⅞—1-inch	60-10	65
1⅛ and larger	60-5	60-5

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers	
and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¾" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.43
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.24
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickest magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00
Do., del. Pittsburgh 85.27

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00
2% carbon, 93.00; 1%, 103.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.65-1.70

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do, 2% 12.50c
Spot ¼c higher

Silicon Briquetes, contract, carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c
Ton lots 5.00c
Less-ton lots 5.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

—The Market Week—

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Struc-tural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.43	3.58	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	3.95	....	5.25
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	4.00	4.00	5.60	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars: 2300	3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	7.90	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	3.60	3.58	7.57	6.17	5.92	7.30	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.85	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.00	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Jan. 26

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$17.47	2 1 0
Basic bessemer	....	15.98	1 17 6
Hematite, Phos. .03-.05	26.91 5 15 0*	.....	.....
Billets	$34.52 7 7 6	$42.60	5 0 0
Wire rods, No. 5 gage	53.24 11 7 6	43.66	5 2 6
Standard rails	$44.46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.95c to 2.05c	5 0 0 to 5 5 0
Structural shapes	2.09c 10 0 0	1.90c	4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.83c	7 5 0*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.41c	8 15 0
Bands and strips	2.77c 13 5 0	2.05c	5 5 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	3.87c 18 10 0	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.73 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.17 4 19 0(a)	$15.79	598	$16.90	500	$24.20 63
Basic bess. pig iron	21.65 4 12 6(a)	.....	...	.....	...	27.79 (b)69.50
Furnace coke	5.38 1 4 2	5.94	225	7.27	215	7.60 19
Billets	34.52 7 7 6	24.95	945	29.07	860	38.58 96.50
Standard rails	1.99c 9 10 0	1.39c	1,155	2.06c	1,375	2.38c 132
Merchant bars	2.42c 11 12 0††	1.44c	1,202	1.65c	1,100	1.98c 110
Structural shapes	2.17c 10 8 0††	1.41c	1,173	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.20c 10 10 6††	1.82c	1,515	2.06c	1,375	2.29c 127
Sheets, black	3.08c 14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c 17 5 0	2.70c	2,250	4.13c	2,750	6.66c 370
Plain wire	4.08c 19 10 0	1.98c	1,650	2.48c	1,650	3.11c 173
Bands and strips	2.58c 12 7 0††	1.71c	1,340	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†12.00
Bos. dock No. 1 exp.	13.00-13.50
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.00-12.50
Chicago, No. 2 auto	11.00-11.50
Cincinnati, dealers.	11.50-12.00
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.00- 9.50
Detroit (industrial)	10.50-11.00
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	13.00-13.50
Federal, Ill.	12.00-12.50
Granite City, R. R.	12.75-13.75
Granite City, No. 2	12.00-12.50
Los Angeles, No. 1	12.50-13.00
Los Angeles, No. 2	11.50-12.00
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.50-17.00
Pittsburgh, No. 1	15.00-15.50
Pittsburgh, No. 2	14.50-15.00
St. Louis, R. R.	13.00-13.50
St. Louis, No. 2	12.00-12.50
San Francisco, No. 1	12.00
Seattle, No. 1	14.00
Toronto, dirs. No. 1	10.00-11.00
Valleys, No. 1	15.00-15.50

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	12.50-13.00
Chicago, dealer	11.50-12.00
Cincinnati, del.	11.00-11.50
Cleveland	13.00-13.50
Detroit	11.75-12.25
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	10.00-10.50
Valleys	14.75-15.25

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.50-15.00
St. Louis	7.50- 8.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers.	7.00- 7.50
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago No. 1	12.50-13.00
Cincin., No. 1, deal.	8.00- 8.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	14.25-14.75
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	7.00- 7.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	5.75- 6.25
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	3.00- 4.00
Toronto, dealers	4.25- 4.75
Valleys	9.00- 9.50

SHOVELING TURNINGS

Buffalo	7.50- 8.50
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.50- 7.00
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.25- 7.75
Cincinnati, dealers.	3.50- 4.00
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.75- 6.25
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.00-13.50
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	7.75- 8.25
Chicago	5.50- 6.00
Cincinnati, dealers.	3.50- 4.00
Cleveland	7.25- 7.75
Detroit	5.75- 6.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.75-16.25

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	17.00-17.50
Chicago, leaf	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.50-18.00
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.75-17.25
Cincinnati, dealers.	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.00-18.50
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	17.50-18.00
St. Louis	14.00-14.50
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	14.25-14.75

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.50-10.00
Cincinnati, dealers	7.25-7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	9.00- 9.50
Cincinnati, dealers	7.00- 7.50
Eastern Pa.	13.50-14.00
New York	†8.50- 9.00
St. Louis	9.50-10.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.50-13.00
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†8.00- 8.25
Buffalo	12.00-12.50
Cleveland	11.50-12.00
Detroit	10.00-10.50
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.75-19.25

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.50-18.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	18.00-18.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00-16.50
Chicago, net	19.00-19.50
Eastern Pa.	21.50-22.50
St. Louis	19.00-19.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†14.75-15.00
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	17.50-18.00
St. Louis, iron	14.50-15.00
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†10.50-10.75
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	12.00-12.50
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	13.50-14.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50
Los Angeles, net	13.50-14.00
New England, del.	12.50-13.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.50-13.00
St. Louis, agri. mach.	14.50-15.00
St. L., No. 1 mach.	15.00-15.50
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.00-10.25
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	9.50-10.00
Eastern Pa.	15.50-16.00
Los Ang., auto, net.	13.00-13.50
New York, break.	†11.50-12.00
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers.	7.00- 7.50
Detroit, net	8.50- 9.00
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	9.00- 9.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	12.00-12.50
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	12.00-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.50-13.00
Swedish low phos.	12.50-13.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten. sh. ton. unit, duty pd. nom.	19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-31.00
So. African, 50-52% nom.	30.00-31.00
Indian, 49-50%	29.00-30.00

—The Market Week—

Sheets, Strip

Sheet and Strip Prices, Pages 70 and 71

Pittsburgh — Although sheet production has been steady or heavier so far this month, dwindling of mill backlogs points to a letdown in output shortly unless new business appears in larger volume. Prices are not regarded a factor in buying hesitancy since new business taken lately has been at firm quotations. Galvanized sheet orders from jobbers are heavier, for stock replacement, but the gain is less than seasonal. Production of galvanized is about 55 per cent, a slight rise, with common and full finished sheet operations steady at the same level. Hot strip output holds about 45 per cent, with cold mills at 55.

Cleveland — Specifications show little change, with new business this month moderately ahead of December. Some automotive buying is reported, but large orders are not expected until the middle of February. Excessive consumer inventories are being reduced gradually. Rumors of price weakness on certain flat-rolled products are denied here by all producers. Mills now are able to make early delivery on all grades of sheets and strip.

Chicago—New business in sheets and strip is steady but light, with the automotive industry not yet in the market for large lots. Meantime, production is declining, as shipments against orders are nearly completed.

Boston — About 16,000 tons of sheets and 5000 tons of plates for an aqueduct pressure line, Metropolitan District Water Supply commission, Boston, have been placed with Bethlehem Steel Co. The sheets, to be used in reinforcing precast pipe, were placed by Lock Joint Pipe Co., Ampere, N. J. Pipe will be installed at Weston, Natick, Wayland, Framingham and Southboro, Mass., and ranges in diameter from 7 to 12½ feet. Sheet specifications generally are numerous but small individually. Total volume has leveled off at slightly under the December rate.

Narrow cold strip operations this month average about 70 per cent, near-capacity production the first half being offset by a letdown the past two weeks. Replacement orders from auto partsmakers continue, with additional buying noted by farm equipment builders. Prices generally are firm.

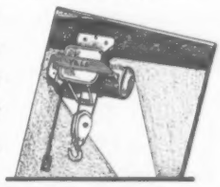
New York—Sheet buying is slightly heavier than a month ago but still is far from brisk. Excess stocks of some consumers defer new purchases somewhat, but the outlook is

Introduced by Yale just a short time ago, the Cable King with its AIR-COOLING feature is already skyrocketing its way to leadership in the electric hoist field. NOW everybody wants AIR-COOLING!

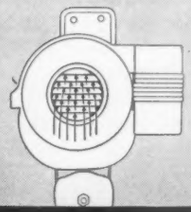
The reason is simple. AIR-COOLING saves the operator money. The basic limiting factor in electric hoist construction has always been excess brake heat. When Yale engineers adapted the special sirocco blower action that would cool the brake frictional parts they, *for the first time,* made it possible to eliminate this heat.

That's the principle of AIR-COOLING—a principle that permits *the Cable King to operate on a heavier duty cycle than any other hoist in the same class.* And that means *greater economy than any other hoist in the same class!*

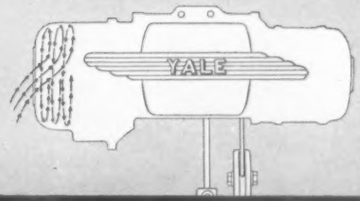
In addition, the precision construction of the Cable King makes it the closest approach to perfect engineering specifications that has ever been built. AIR-COOLING plus mechanical perfection—that's what you get in the Cable King. It's the very latest advance in hoisting equipment. Contact your local distributor or send direct for free catalogue.



STARTLING AND EXCLUSIVE AIR-COOLING PRINCIPLE . . .



The Greatest Economy Factor Ever Developed in Electric Hoist Construction.



YALE

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

encouraging. Electric refrigerator builders require larger tonnages and stove specifications are heavier than usual for this period.

Having leveled off for the last two weeks, narrow cold strip volume reaching eastern mills is somewhat less than expected. Orders are frequent, but small, for prompt delivery. Strip is lagging behind wire with some sellers producing both products.

Philadelphia—Buying is expanding moderately but still reflects last quarter's anticipatory purchases. This is less true of jobbers and large consumers than of smaller users. Philco Radio & Television Corp., this city, has acquired the appliance division of Fairbanks, Morse & Co. to make electric refrigerators, but all steel purchases will be made at Indianapolis, it is said.

Buffalo — Despite absence of forward buying, sheet and strip demand is fairly well sustained. Orders generally call for immediate shipment and are principally from miscellaneous users. Jobber buying lags.

Cincinnati—Sheet buying is moderately heavier and well diversified, business being back to the level of early December. Automotive shipments tend to expand, but new business covers only early needs.

St. Louis—Sheet orders continue to taper, while shipments, except for galvanized, also are declining. The lull is believed temporary and due to the season, with the early spring outlook promising. Production is off slightly.

Birmingham, Ala.—Production of sheets remains at capacity with some pressure being exerted for delivery, although no appreciable backlogs have accumulated. Demand is fairly evenly divided between roofing and manufacturers' sheets. Except for occasional runs in cotton ties for reserve, there is little production of strip.

Plates

Plate Prices, Page 70

Cleveland — Plate inquiries have improved less than expected. Tank and boiler work continues restricted, and railroad orders are limited to imperative repairs. Production is unchanged, with delivery available within a week in most instances.

Chicago — Outlook for plate demand is brightened by pipe line building and pending freight car orders also are seen as a source of support. Public works requirements are tapering slightly.

Boston — Miscellaneous plate buying is light and spotty, with boiler, railroad and structural shop requirements lagging. Water tank needs have slackened. Outstanding plate project is 1500 tons for a siphon under Chelsea creek, Boston, a metropolitan district sewer section. A recent spurt in floor plate demand includes 350 tons for utilities in several areas outside New England.

New York — Except for some large-diameter pipe, for which a sizable plate tonnage was placed, the market is quiet. Prospective shipbuilding is a bright spot in the outlook. Two cargo boats, involving about 6000 tons of hull and superstructure steel are expected up for bids soon for Moore & McCormack Co. Inc. Plate demand from the oil industry has slumped, and tank and boiler manufacturers are specifying lightly. Orders from railroads continue disappointing.

Outstanding order was 5000 tons placed by Lock Joint Pipe Co. with Bethlehem Steel Co. for concrete pipe for the Metropolitan Water commission, Boston. The work also includes a heavy tonnage of sheets and concrete bars.

Approximately 10,000 tons of plates will be required for two tankers for Socony-Vacuum Oil Co. Inc. on which construction bids are being asked. These are the first tankers out this year.

Philadelphia — One of the few outstanding purchases of the week was 500 tons by the Reading Co. for hopper car repairs. Demand generally is sluggish, although early improvement in commercial tank and boiler work is indicated. New buying for ship work is absent, but about 12,000 tons of steel, mainly plates, will be required for four cruisers to be bid Feb. 15.

Birmingham, Ala.—Plate output remains at approximately 60 per cent. Specifications have been filled in the case of Southern Railway's order for 1300 freight cars, but some shipbuilding business is expected to materialize soon.

Seattle—Despite absence of active projects calling for large lots, plate inquiries have increased. Oil companies are reported planning to increase fuel storage capacity in Alaska. Awards include 180 tons of plates and shapes for a tanker for Petroleum Navigation Co., Seattle.

San Francisco—Plate business was limited to lots of less than 100 tons. American Pipe & Steel Corp. is low on over 650 tons of 8 to 12-inch welded steel pipe for Fallbrook, Calif. To date this year 2678 tons have been placed, compared with only 86 tons for the corresponding period last year.

Washington — Maritime commission has received bids from five companies for a twin-screw diesel-powered cargo vessel for Erie & St. Lawrence Corp., New York. Vessel to be 290 feet long, 42 feet beam, displacement 4094 tons. No date for award has been set.

Bids were: Defoe Boat & Motor Works, Bay City, Mich., $464,000; Ingalls Iron Works, Birmingham, Ala., $420,000; Manitowoc Shipbuilding Co., Manitowoc, Wis., $527,295; Charleston Shipbuilding Co., Charleston, S. C., $330,000, $345,000 and $355,000 with different sized engines; Odgensburg Shipbuilding Co., Buffalo, $285,000.

Navy department will open bids March 22 on an aircraft carrier of about 20,000 tons displacement.

"No Weakness in Steel Prices", Say Sellers

■ Denial of a published report that weakness in steel prices had caused a smaller volume of buying is voiced by E. T. Weir, chairman of National Steel Corp., and other steel executives.

"I know of no weakness in the steel price structure," said Mr. Weir, "nor has National Steel Corp., which sells steel products throughout the country, encountered price competition in the form of eliminated extras or other concessions. There has been some easing in demand for steel, which is not unexpected at this time of year.

"It certainly is not due to any withdrawal of buyers who wish to place steel specifications but are holding back because of some supposed weakness in the price structure. The present decline in buying is not serious and by March we undoubtedly will find consumer demand upward again."

Other executives have been quoted to the same effect in denial of the rumored weakness.

Plate Contracts Placed

5000 tons, with 16,000 tons sheets, for aqueduct pressure line, Boston, metropolitan district water supply commission, to Bethlehem Steel Co., Bethlehem, Pa.

Plate Contracts Pending

1865 tons, black and galvanized steel plates, sheets and strip, bureau of supplies and accounts, navy department, schedule 5366; bids Jan. 31.

1500 tons, siphon under Chelsea creek, metropolitan sewer system, Boston, section 101, Silas Mason Co., New

York, low, $968,310; Metropolitan District commission project.

678 tons, 8 to 12-inch welded steel pipe, Fallbrook, Calif.; American Pipe & Steel Corp., Los Angeles, low at $59.522.

250 tons, four 600-pound boilers, specification 9074, Pearl Harbor, T. H.; Edgemoor Iron Works, Edgemoor, Del., low at $288,157 on schedule 1, and $280,745 on schedule 2.

Bars

Bar Prices, Page 70

Cleveland—Demand is steady, although new business from farm equipment builders has shown the largest gain in several weeks. The current lull in specifications from auto partsmakers is expected to be relieved the latter part of February. Inventories of most consumers are reported relatively low.

Chicago—Several producers report better business in carbon and alloy bar business. Although heavy buying by automotive interests has lagged, industrial truck, tractor and farm implement builders have placed larger orders.

Boston—Bar orders are scattered and small, with alloy material relatively most active. Forging shops are placing some new business, but bolt, nut and small tool needs are spotty and jobbers are specifying only to balance inventories. Government shops and private shipbuilders are frequent buyers.

New York—Commercial bar sellers still anticipate an appreciable increase in business this quarter, but admit the betterment has been slight so far this month. Improvement has been chiefly inventory replacement by jobbers and some scattered railroad specifications for shop repairs. There has also been a mild gain in machine tool releases.

Philadelphia — Bar demand is aided by moderate replacement buying following the inventory season, but ordering is largely hand-to-mouth. Improvement in alloy and cold drawn material is greater than in carbon steel. The latter is suffering from further inroads by pressed sheets and strip.

Birmingham, Ala. — Resumption of schedules in several construction projects has aided bar production, especially concrete reinforcing bars. Manufacturers of agricultural implements continue to account for considerable bar business.

Tin Plate

Tin Plate Prices, Page 70

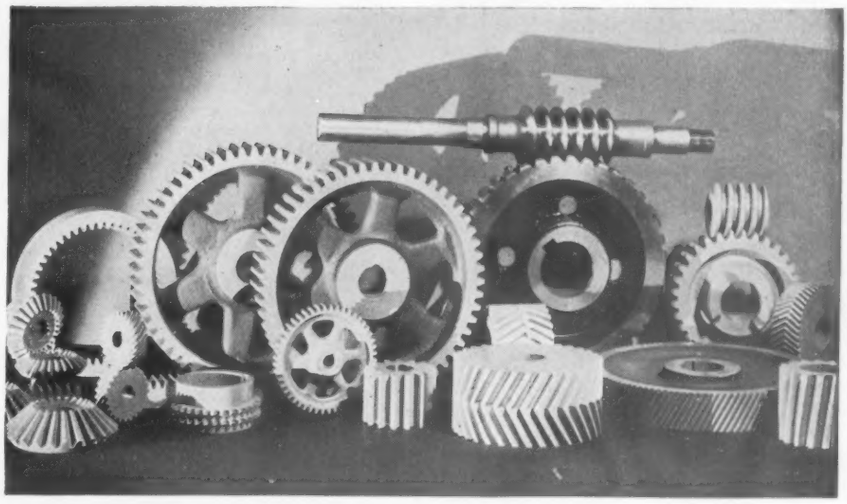
Further improvement in tin plate production, now at 45 per cent, is in early prospect. The canners' convention at Chicago last week brought out predictions of a 25 per cent increase in tin plate output this year.

Buying lately has been hesitant and somewhat disappointing, considering the low state of consumer inventories, but will be bolstered shortly by the advent of orders for food packers' needs. Current production is overbalanced on the side of general line containers and miscellaneous manufacturing requirements. February is expected to see more active buying for sanitary can production.

Pipe

Pipe Prices, Page 71

Pittsburgh — Pipe business is steady at the December rate. Standard pipe is moving well, although jobbers are ordering only enough to replace stocks. Railroad orders are slightly better and automotive buying largely is for fill-in purposes. Standard pipe consumption in building work represents the largest share of current demand, although



GEARS! GEARS! GEARS!

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● Whether you require Spur, Spiral, Helical, Herringbone, Bevel, Mitre, Internal or Worm Gears or Worms or Non-metallic Pinions . . . here they are . . . the finest made. For nearly half a century Horsburgh & Scott has concentrated on making gears that represent the best in engineering design, accurate workmanship and fine materials. Best of all, they're not expensive because they're standardized and made to endure. On your next order try these finest of gears.

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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE, CLEVELAND, OHIO, U. S. A.

oil country goods are expected to be more active soon.

Cleveland — Standard pipe shipments by jobbers this month are placed 10 per cent ahead of December. Cast pipe production is close to capacity, with backlogs sufficient to last through March. National Tube Co. has booked 290 tons of steel pipe for a Lorain, O., water line.

Chicago—Pending business in cast pipe is lighter, following recent closing on public works projects. Only about 20 per cent of the pipe required for government-aided work under way before Jan. 1 remains to be bought, it is estimated. The outlook is uncertain, depending upon the trend in private construction in the event additional federal allocations are not available. Chicago opened bids last week on 1140 tons.

Boston — With only one large individual contract included, 800 tons, Saugus, Mass., cast pipe purchases approximate 1565 tons, of which 335 tons is for four destinations, bought through the local procurement office. Practically all inquiry is for small diameters, 6-inch predominating. Merchant steel pipe buying is steady, but not heavy, with plumbing and heating requirements tending upward. Except for 3000 feet of 22-inch steel pipe for Saugus, Mass., inquiry for larger diameters is light.

New York — Pipe buying for the three major housing projects here is completed, with 300 to 400 tons each pending for similar work at Syracuse and Utica, N. Y. Releases for ship and airplane building are steady. A pickup in pipe business is counted on, following recent settlement of the long strike of plumbing supply truckmen.

Cast pipe buying is light, small orders predominating. The expected inquiry by New York city for yard stocks has not yet appeared, several thousand tons being required. Purchasing by the district procurement divisions is small. Westchester county is inquiring for several hundred tons of 54-inch.

Seattle — Cast pipe is quiet, with no early gains in demand expected. Largest pending project is 500 tons of 6 and 8-inch for Spokane, bids Feb. 2. Awards include 110 tons for projects at Yakima and Selah, Wash. Bellingham, Wash., has a federal grant of $512,628 for a water system extension.

Steel Pipe Placed

1100 tons, steel pipe, various sizes, water works, Cincinnati, to American Rolling Mill Co., Middletown, O.

230 tons, 12¾-inch, and 60 tons 18-inch, water line, city of Lorain, O., to National Tube Co., Lorain.

175 tons, 24-inch, steel pipe, sewer, Dairen, Conn., to National Tube Co., Pittsburgh.

Unstated tonnage, 200 lengths, 20-inch welded shore pipe, United States engineer, Galveston, Tex., to Kane Boiler Works Inc., Galveston, $5406, f.o.b. Galveston; bids Jan. 9, pro. 138.

Cast Pipe Placed

800 tons, 4 and 6-inch, class 150, east bay municipal utility district, Oakland, Calif.; allocated as follows: 640 tons, 6-inch, to United States Pipe & Foundry Co., Burlington, N. J., and 160 tons, 4-inch, to American Cast Iron Pipe Co., Birmingham, Ala.

800 tons, 20-inch, sewer, Saugus, Mass., to United States Pipe & Foundry Co., Burlington, N. J.; also 30 tons, 6-inch, class C, North Adams, Mass.

265 tons, 8-inch, Attleboro, Mass., to Warren Foundry & Pipe Co., Everett, Mass.

165 tons, mostly 6-inch, Framingham, Peabody, Methuen and Lowell, Mass., to Warren Foundry & Pipe Co., Everett, Mass.

110 tons, WPA projects at Yakima and Selah, Wash., to H. G. Purcell, Seattle, representing United States Pipe Foundry Co., Burlington, N. J.

Cast Pipe Pending

2500 tons, 4 to 12-inch, Los Angeles, specification 2902; bids opened.

1140 tons, city of Chicago yards; bids opened Jan. 26.

550 tons, 6 and 8-inch, Class 150 bell and spigot, for Spokane, Wash.; bids to C. T. Bogart, purchasing agent, Feb. 2.

335 tons, 6 to 16-inch, procurement division, treasury department, Boston, including 75 tons for Framingham, Mass.; 75 tons, Springfield, Mass., and 170 tons, 16-inch, Pittsfield, Mass.; latter being class C; bids in.

Wire

Wire Prices, Page 71

Cleveland—Wire mill operations continue at 60 per cent. Shipments are well ahead of December, with further gains expected in February as a result of better demand from agricultural centers. Seasonal lag in automotive demand is retarding manufacturers' wire specifications. Prices of merchant items have strengthened materially.

Chicago—Sales of wire and wire products are lighter. Prices are firm but the market, frequently sensitive, was affected adversely by rumored price weakness early in the week. Quieter demand, while fairly general, is expected to disappear early in February, aided by heavier business from the automotive industry.

Boston — While finishing operations in some departments are down a few points, tonnage taken by wire mills this month will at least equal that of December. Manufacturers' wire is moving in good volume for prompt delivery. Producers of automobile accessories are buying frequently. Specialties are more spotty. The textile equipment industry demand is sub-normal. Prices on most products are firm, but in spots where competition is notably keen, some shading is reported.

New York—General Cable Corp., New York, has been awarded the contract for 24,000,000 feet of copper core, steel combination, rubber covered wire for the army signal corps, Brooklyn, at $5.045 per thousand feet, bids Jan. 6, pro. 117.

Birmingham, Ala.—Wire products have shown a heartening pick-up in the past week with production estimated at 70 per cent or slightly better.

Rails, Cars

Track Material Prices, Page 71

Rail buying is gaining force, more than 151,000 tons having been placed in the past week, led by 74,214 tons by the Union Pacific, 40,472 by the Southern Pacific and 25,000 by the Southern Railway.

Scattered car and locomotive inquiry and buying is also contributing somewhat. Great Northern is asking bids on 25 tank cars and the Pennsylvania on an additional five diners. Chicago & North Western has placed two 10-car streamlined trains with diesel-electric locomotives.

Bangor & Aroostook is inquiring for 80,000 tie plates for use with rails bought last year but not laid.

Rail Orders Placed

Boston & Maine, 600 tons, to Bethlehem Steel Co., Bethlehem, Pa.

Seaboard Air Line, 5200 tons, to Bethlehem Steel Co.; in addition to 8000 tons recently awarded Tennessee Coal, Iron & Railroad Co.

Southern Pacific, 40,472 tons; 19,237 tons to Columbia Steel Co., San Francisco, to be rolled by Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; 8970 tons to Colorado Fuel & Iron Co., Denver; 12,265 tons to Bethlehem Steel Co., Bethlehem, Pa.

Soo Line, 6000 tons, 3800 to Carnegie-Illinois Steel Corp., remainder to Bethlehem Steel Co. and Inland Steel Co.

Southern Railway, 25,000 tons, and accessories, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Union Pacific, 74,214 tons, 32,657 tons each to Carnegie-Illinois Steel Corp. and Colorado Fuel & Iron Corp.; 8900 tons to Inland Steel Co.; 26,000 tons fastenings will be distributed later.

Car Orders Placed

Chicago & North Western, two 10-car streamlined diesel-electric-powered passenger trains; court permission granted; cars to Pullman Car Mfg. Co., Chicago; locomotives to Electro-Motive Corp., LaGrange, Ill.

Car Orders Pending

Great Northern, twenty-five 16,000-gallon

tank cars; bids asked.
Mexican Government Railways, 10 flat cars and 10 gondolas, all of 50 tons capacity, bids asked.
Pennsylvania, five dining cars; in addition to 15 diners and 12 coaches recently placed.

Locomotives Placed

Texas-Mexican Railway Co., seven diesel locomotives, to Baldwin Locomotive Works for erection by Whitcomb Locomotive Co., subsidiary of Baldwin, Rochelle, Ill.; electrical equipment Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Buses Booked

Mack Trucks Inc., New York: Fifty 40-passenger buses for W. F. Transportation Co. of New York; New York; involves more than $500,000.

Shapes

Structural Shape Prices, Page 70

Pittsburgh—Fabricated shape orders and new projects are lighter, although private work is more plentiful among inquiries. The latter is headed by 3000 tons for press and die shops at Grand Rapids, Mich., for General Motors Corp.

Cleveland—While awards are confined to small jobs, pending business includes a substantial tonnage for a factory building, Toledo, O., approach to the Main street bridge, Cleveland, and the Cuyahoga river strengthening project here. Public work predominates larger construction, but small private inquiries are more active.

Chicago—Few awards or inquiries involve large lots, but pending business is sustained in fairly heavy volume. Bookings include 500 tons for a national guard building here. Among the leading inquiries is 1000 tons for a state bridge, Waterloo, Iowa.

Boston — Structural inquiry continues to slacken with contracts generally limited to requirements pending for some time. An exception is public work in Connecticut, mostly state institutional buildings, taking several thousand tons. Recent flurry in steel piling has subsided following the purchase of approximately 2850 tons. Bridge needs are small with I-beam spans in Vermont furnishing the bulk of activity.

New York — New inquiry continues to sag, public work accounting for the meager volume coming up for bids. A good part of the pending volume, estimated several weeks ago is also under contract and a dull period during the next few weeks is evident in this territory. Awards include additional tonnage for Delaware Aqueduct water supply, 6650 tons, structural steel tunnel supports and steel sheet piling, requiring practically no shop fabrication.

Philadelphia — Structural awards have declined sharply since the first of the year, with a caisson order involving 700 tons outstanding. Several small school jobs have been placed recently and some small miscellaneous bridge work is actively pending. Fabricators look for little

Shape Awards Compared

	Tons
Week ended Jan. 28	**26,671**
Week ended Jan. 21	**33,035**
Week ended Jan. 14	**27,885**
This week, 1938	**16,507**
Weekly average, year, 1938	**21,566**
Weekly average, 1939	**32,612**
Weekly average, December	**30,283**
Total to date, 1938	**71,913**
Total to date, 1939	**130,449**

Includes awards of 100 tons or more.

THE LAST STEP
IN THE PRODUCTION OF
ST. JOE *Electro-Thermic* **ZINC**

The ore from the St. Joseph Lead Company's zinc mines at Edwards and Balmat, New York has passed through the smelter at Josephtown, Pa. The last step in production is now being taken, the casting of the slabs of zinc. Soon they will reach the consumer, and another transformation begins. Some will go to rolling mills and emerge as strip or sheet. Galvanizers use others to protect wire fences and sheet steel roofing against corrosion. Tons of them will appear in the countless products made of brass and nickel silver. Irrespective of the purpose for which it is to be used, one of three grades of St. Joe Electro-Thermic Zinc will meet your requirements.

ST. JOE HIGH GRADE · ST. JOE INTERMEDIATE · ST. JOE PRIME WESTERN

ST. JOSEPH LEAD COMPANY
250 PARK AVE., NEW YORK ELdorado 5-3200
PLANT AND LABORATORY, JOSEPHTOWN, BEAVER COUNTY, PA.

real improvement, however, much before early spring.

Buffalo—The first bidding dates of which is expected to be a large number of school projects were announced recently.

Shape Contracts Placed

6650 tons, structural steel tunnel supports and steel sheet piling, 3500 tons and 3150 tons respectively Rondout-West branch section, Delaware Aqueduct project, Carmell, N. Y., contract 321, two shafts and approximately 35,000 feet tunnel, to Bethlehem Steel Co., Bethlehem, Pa.; Frazier-Davis Co., general contractors, bids Dec. 21, Board of Water Supply, New York.

1900 tons, for stockyards pavilion at Indianapolis, to American Bridge Co., Pittsburgh, through Simmons Construction Co., general contractor, Indianapolis.

1555 music hall, Purdue university, Lafayette, Ind., to American Bridge Co., Pittsburgh.

1500 tons, H columns, foundation for Ford Motor Co. plant, Long Beach, Calif., to Columbia Steel Co., San Francisco.

904 tons, state highway bridge, George West, Tex., to Virginia Bridge Co., Roanoke, Va.

800 tons, Canajoharie-Palatine bridge, Montgomery county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; through McLain Construction Co., Buffalo.

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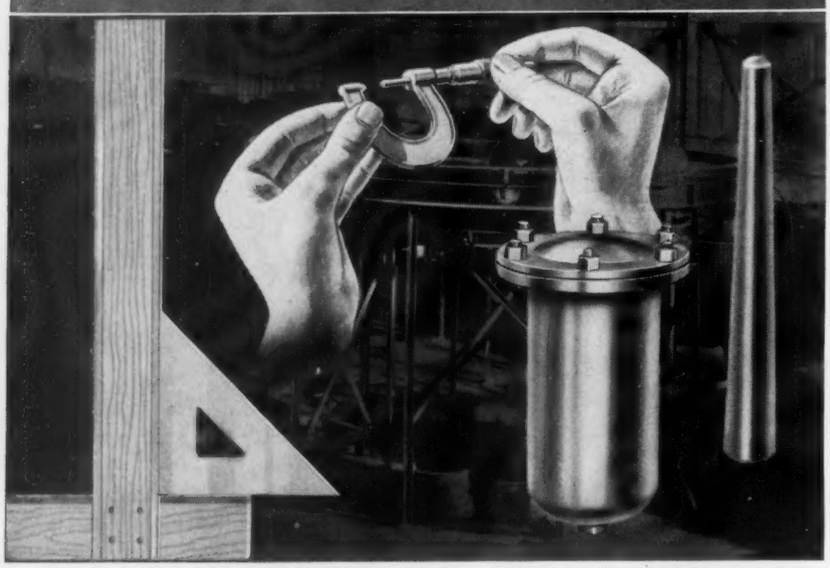
DEEP DRAWN SHELLS AND SHAPES



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You and your customers both benefit when Hackney precision-made shapes and shells are used in your products. You secure the cost and time saving economies made possible by Hackney's more than 35 years of designing and manufacturing experience. And the users of your equipment receive extra durability and dependability.

The Pressed Steel Tank Company pioneered the cold drawing of seamless containers from metal plates. Where welding is desirable, the Hackney method has won recognition for its superiority. The performance records of the millions of Hackney special shapes and containers are your assurance of complete satisfaction.

Utilize Hackney's unique facilities. Let Hackney engineers work with you in developing new shapes or containers to meet your particular problems or in improving the product which you are now using.

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Containers for Gases, Liquids and Solids

725 tons, state office building, Columbia, S. C., to Southern Engineering Co., Charlotte, N. C.

700 tons, pier caissons, Cape May county bridge development, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.

610 tons, addition, Marine hospital, Stapleton, Staten Island, New York, to Bethlehem Fabricators Inc., New York; through H. R. H. Construction Co.

565 tons, isolation hospital, Jersey City, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

550 tons, hangar and headquarters building, Chicago, for state of Illinois, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, police and fire headquarters building, Providence, R. I., to James H. Tower Iron Works, Providence, New England Concrete Co., Providence, general contractor.

500 tons, addition, structural shop, Norfolk navy yard, Portsmouth, Va., to Rust Engineering Co., Pittsburgh, $112,280, spec. 8997; bids Jan. 18, bureau of yards and docks.

500 tons, bridge, Harding boulevard, Queens, N. Y., to American Bridge Co., Pittsburgh; Elmhurst Contracting Co., New York, general contractor.

500 tons, school, Delhi, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; through Andrews Weston Construction Co., New York.

385 tons, junior-senior high school, Harrison, N. Y., to Utica Structural Steel Co., Utica, N. Y.; through J. A. J. Construction Co., Brooklyn.

360 tons, bridge, Bradley-McMinn counties, Tennessee, to Nashville Bridge Co., Nashville, Tenn.

350 tons, high school building, Billings, Mont., to Bethlehem Steel Co., Bethlehem Pa.

325 tons, three state bridges, route six, New Jersey, to American Bridge Co., Pittsburgh.

325 tons, underpasses, Main avenue and Erie railroad, route 6 section 8A Clifton, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through Union Building & Construction Corp., Passaic.

325 tons, store addition, Joske Bros., San Antonio, Tex., to Alamo Iron Works, San Antonio.

320 tons, sewage treatment plant, Queens, N. Y., to American Bridge Co., Pittsburgh; through Tully & Dinapoli Inc., New York.

310 tons, housing project, Syracuse, N. Y., to Empire Steel Co., Syracuse, N. Y.

305 tons, women's dormitory, Minneapolis, to Crown Iron Works Co., Minneapolis.

300 tons, finishing building, Rock Hill Printing Co., Rock Hill, S. C., to Southern Engineering Co., Charlotte, N. C.

275 tons, garage roof, Schaefer Brewing Co., Brooklyn, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., New York, general contractor.

270 tons, home economics building, Connecticut state college, Storrs, Conn., to Haarmann Steel Co., Holyoke, Mass.; through Frank D. Rich Co.

250 tons, heating plant, Scott Field, Ill., to Superior Structural Steel Co., St. Louis; MacDonald Construction Co., St. Louis, general contractor.

250 tons, H columns, warehouse, Harrison and Spear streets, San Francisco, to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, school, Wilkesbarre, Pa., to the Reading Metalcraft Co., Reading, Pa.

225 tons, state bridge over Snake river, Shelly, Idaho, to American Bridge Co., Pittsburgh.

215 tons, bridge 1269-F-335-B, Alcorn county, Mississippi, to Virginia Bridge Co., Roanoke, Va.

200 tons, beam spans bridge, New Jersey, to Lehigh Structural Steel Co., Allentown, Pa.

200 tons, Scioto river overflow bridges,

Waverly, O., to unnamed fabricator.

190 tons, bridges, McHenry county, Illinois, to Midland Structural Steel Co., Cicero, Ill.

180 tons, high school, Mahamoy township, Pennsylvania, to Weatherly Steel Co., Weatherly, Pa.

178 tons, steel sheet piling, United States engineer, Providence, R. I., to Bethlehem Steel Co., Bethlehem, Pa.; bids Jan. 19, pro. 181.

175 tons power house addition, South Bend, Ind., to Edwards Iron Works, Inc., South Bend.

159 tons, I-beam bridge, Chester, Vt., and Adams bridge, I-beam, Wilmington, Vt., to American Bridge Co., Pittsburgh; Sawyer & Swett, Winchester, N. H., and B. A. Simeon, Inc., Medford, Mass., general contractors respectively; Bethlehem Steel Co., Bethlehem, Pa., awarded 54 tons, 84-foot I-beam bridge, Morristown, Vt.; Prairie Bros., Alburg, Vt., general contractors.

145 tons, county home infirmary building, Beaver, Pa., for Beaver county, to Pittsburgh Bridge & Iron Works, Pittsburgh.

145 tons, central branch library, Jamaica, N. Y., to American Bridge Co., Pittsburgh; through procurement division, New York.

140 tons, bridge FAP-151, Bee county, Texas, to Mosher Steel Co., Dallas, Tex.

135 tons, National Institute of Health, Bethesda, Md., for United States treasury department, to Barber & Ross Co. Inc., Washington.

135 tons, switch house, sewage treatment plant, Detroit, to Whitehead & Kales Co., Detroit.

120 tons, east approach to Main avenue bridge, Cleveland, for Cuyahoga county, Ohio, to Mt. Vernon Bridge Co., Mt. Vernon, O.

120 tons, addition and alterations, high school, Ambler, Pa., to Max Corchin.

120 ton, building, Delaware Motor Sales Co., Wilmington, to Frank M. Eaver & Co., Lansdale, Pa.

110 tons, recreation building, Butlersville ,Ind., to Hetherington & Berner, Inc., Indianapolis.

105 tons, field house, Pittsburgh, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

105 tons, bridge cont. 437, Callahan county, Texas, to Central Texas Iron Works, Waco, Tex.

105 tons, Fenton bridge, Brimfield, Mass., to American Bridge Co., Pittsburgh.

105 tons, bridge, Errol, N. H., to American Bridge Co., Pittsburgh.

100 tons, 200-man barracks, Scott Field, Ill., to Columbia Iron Co., St. Louis; MacDonald Construction Co., St. Louis, general contractor.

100 tons, plant addition, Eaton Mfg. Co., Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

100 tons, high school, Erdenheim, Pa., to Frank M. Weaver Co., Lansdale, Pa.

Shape Contracts Pending

7500 tons, structural steel tunnel supports, contract 313, Rondout-West branch, Delaware aqueduct, Wawarsing to Gardiner, Ulster county, New York; Samuel Rosoff, New York, low, 18,916.650, bids Jan. 24, board of water supply, New York.

3000 tons, press and die shops, Fisher Body division, General Motors Corp., Grand Rapids, Mich.

2000 tons, Triborough hospital, Queens, N. Y., John Kenny Co., New York, low.

1000 tons, state highway bridge, Waterloo, Iowa; closing Jan. 31.

1000 tons, factory building, Toledo, O., for Toledo Scale Co., Toledo; bids in.

854 tons, including 22 tons plates, overcrossing near Turloc, Stanislaus county, California; new bids Feb. 8.

700 tons, addition to school, Cambridge, Mass.

600 tons, piling and 160 tons of reinforcing bars, Carter road bridge; Cleveland; Lombardo Bros. Construction Co., Cleveland, general contractors.

525 tons, Cross Bay bridge toll structures, for New York city parkway authority, New York.

500 tons, public school No. 18, Buffalo; bids Feb. 28.

450 tons, heating plant, Gallinger hospital, Washington.

425 tons, state bridge, Winslow, Ariz.

400 tons, overhead crossing, Chicago, Burlington & Quincy railroad, Greybull, Wyo., for state.

350 tons, retail market, for city of New York.

330 tons, state bridge, Beaver county, Pennsylvania, bids opened Jan. 27.

250 tons, school, Cate, N. Y., for board of education.

225 tons, bracing, for Cathedral of St. John the divine, New York.

210 tons, Washington state undercrossing Spokane county; bids at Olympia, Feb. 7.

200 tons, building, for American Smelting & Refining Co., Newark, N. J.

200 tons, Essex retail market, Manhattan, N. H.; Lieb Construction Co., New York, low.

200 tons, high school, Corfu, N. Y.; bids Feb. 10.

200 tons, central school, Fillmore, N. Y.; bids Feb. 16.

196 tons, three bridges in Tehama coun-

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—a new tool for handling raw materials and finished products. It multiplies man power—speeds handling—lightens loads—tiers to the roof—cuts costs radically in a new economic era that requires new thinking, new methods, new mechanical aids. With the Clark Carloader, one man can load or unload a box car in two hours.

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ty, California, for bureau of public roads; Joseph Shaw, 11,000 Broadway Terrace, Oakland, Calif., low on general contract at $110,000.

190 tons, 2-span I-beam bridge, overall length 148 feet, route 25, and 2-span plate girder bridge, overall length 207.2 feet, route 25, Bradford Village, Vt. known as Crafts and Cassville bridges respectively, Waits river; bids Feb. 10, H. E. Sargent, commissioner of highways Montpelier, Vt.

175 tons, factory building, for Kilian Mfg. Corp., Syracuse, N. Y.

150 tons, garage, for Ace Automobile Co., Brooklyn, N. Y.

150 tons, railroad bridge, Lake Zurich, Ill., for state.

150 tons, reconstruction of bridge 10/75, Montgomery county, Pennsylvania, for Reading Co.

150 tons, I-beam bridges, Haynes, Blue Brook and Boyd spans, 89-foot, 79-foot and 74-foot respectively, West Dover Village, Vt.; Bids Feb. 10, H. E. Sargent, commissioner of highways, Montpelier, Vt.

130 tons, factory and office building, Cleveland, Pneumatic Tool Co., Cleveland; bids in.

125 tons, stop log guides, specification 1173-D, Odair, Wash., for bureau of reclamation.

100 tons, central school Van Etten, N. Y.; bids Feb. 2.

Unstated, two gate hoists for Roza diversion dam, Washington state; bids to Denver Feb. 8. Spec. 822.

Unstated tonnage, ramp running from east approach to Main street bridge to West Third street, Cleveland; bids Feb. 24, cost $400,000.

Unstated, school, Wilmington, Del., General Construction Co., Baltimore, low, with a bid of $52,270.

Many of the rods for Knee Action Coil Springs are 16 feet long by ⅝" diameter.

Complete HEATING EQUIPMENT for making 300 Knee Action Coil Springs per Hour

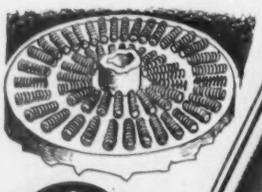
1 First operation is heating in the "Salem" Rod Heating Furnace (oil fired). From the charging door rods roll by gravity down the inclined hearth to discharge door. Capacity of furnace 300 rods per hour.

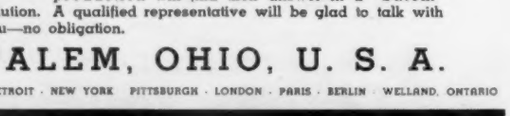
2 Second is the coiling operation. The furnace keeps plenty of rods supplied. Coiler can be seen in illustration above, to the right at rear of furnace.

3 Third, the hardening operation in a "Salem" oil fired Rotary Hearth Hardening Furnace. Furnace employs the advantages of the rotary hearth principle and is designed so there is no flame impingement. Coils are loaded as shown below, for forced production two deep and two high on special carriers.

4 Fourth, the quench where jigs and manual operation are required to prevent warpage and distortion.

5 Fifth, the "Salem" Draw Furnace, oil fired, convection heated, continuous mesh belt conveyor. This draw furnace is of special design.





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SALEM ENGINEERING COMPANY

Reinforcing

Reinforcing Bar Prices, Page 71

Pittsburgh — Reinforcing bar awards are lighter, although there are still fair numbers of new jobs appearing. Most current tonnage involves tonnages less than 100 tons. There has been a slight increase in the number of private jobs, although the larger part is still government work.

Cleveland—Inquiries are slow to improve, with private work still lagging. A few large public projects will appear for bids soon. General contract for the Carter road bridge here, involving 160 tons of bars and 600 tons of piling went to Lombardo Bros. Construction Co.

Chicago — Shipments are heavier and are cutting into mill backlogs. In the meantime, pending tonnage has declined slightly, because of recent closings of numerous small-lot PWA projects. No new inquiries over 100 tons are reported but considerable heavy tonnage is seen the next 30 days.

Boston—Purchase of close to 14,000 tons for a water aqueduct pressure line, Metropolitan District Water Supply commission project, is the largest in this territory in many years. Tonnage went to Bethlehem Steel Co., Bethlehem, Pa. Most awards are for small lots with a considerable drop in new tonnage inquiry. Concrete bar prices continue soft with competition probably keener in this than other steel products. Connecticut opens bids Feb. 6 on highway projects taking several hundred tons.

New York — Reinforcing bar awards are fewer with a consequent decline in tonnage going to mills.

Concrete Bars Compared

	Tons
Week ended Jan. 28	23,077
Week ended Jan. 21	19,518
Week ended Jan. 14	15,290
This week, 1938	5,211
Weekly average, year, 1938	6,959
Weekly average, 1939	14,736
Weekly average, December	8,973
Total to date, 1938	25,785
Total to date, 1939	58,945

Includes awards of 100 tons or more.

Close to 800 tons for highway and bridge projects, New Jersey, have been placed. Part of 1000 tons pending for New York state highways, mostly mesh, will not be bought by contractors until early spring. Small-lot buying, until recently active, has slumped, contractors having covered on most of such needs. Prices continue weak, despite efforts on the part of some distributors to stabilize.

Philadelphia—Awards are decidedly spotty, following relatively fair buying in the closing weeks of last year. Prices continue unsettled.

San Francisco—All work on placing reinforcing bars has just been stopped in the San Francisco district due to demand of steel workers for an increase from $10 to $11 per day.

Reinforcing Steel Awards

14,000 tons, aqueduct pressure line, metropolitan district water supply commission, Boston, to Bethlehem Steel Co., Bethlehem, Pa., through Lock Joint Pipe Co., Ampere, N. J.; material includes approximately 10,000 feet, precast steel cylinder reinforced concrete pressure pipe, 12½-foot diameter; about 60,000 feet, 11½-foot diameter, and 2200 feet, 7-foot diameter, the work being in Southboro, Framingham, Wayland, Natick and Weston, Mass.; original bids Dec. 19, contract 85, Frank E. Winsor, Natick, chief engineer for commission.

1200 tons, unit 11 Lake Washington bridge, Seattle, to Bethlehem Steel Co., Seattle; Rumsey & Co., Seattle, general contractor.

900 tons, units 5 and 9 Lake Washington bridge, Seattle, to Bethlehem Steel Co., Seattle; Puget Construction Co., Seattle, general contractor.

713 tons, quay wall, navy yard, Mare Island, Calif., to Gilmore Fabricators Inc., San Francisco.

700 tons, unit 2 Lake Washington bridge, Seattle, to Seattle Steel Co., Bates & Rogers Construction Co., Chicago, general contractor.

650 tons, unit 1 Lake Washington bridge, Seattle, to Bethlehem Steel Co., Seattle; Northwest Construction Co., Seattle, general contractor.

600 tons, unit 7 Lake Washington bridge, Seattle, to Seattle Steel Co.; Daily Construction Co., Seattle, general contractor.

525 tons, section, Delaware aqueduct, Carmel, N. Y., contract 321 board of water supply, New York, to Bethlehem Steel Co., Bethlehem, Pa.; through Frazier-Davis Co.

500 tons, reservoir, Grand Rapids, Mich., to Inland Steel Co., Chicago; Owen, Ames-Kimball, contractors.

475 tons, five span reinforced concrete arch bridge, route 6 section 9, Little Falls, N. J.; through Bates & Rogers Construction Corp., New York.

400 tons, state office building, Frankfort, Ky., to Truscon Steel Co., Youngstown, O.; Skilton Construction Co., Louisville, Ky., contractor.

325 tons, reservoir, Maplewood, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; LaFera-Greco Contracting Co., Newark, N. J., contractor.

250 tons, training school, Springfield, Mass., to Concrete Steel Co., Boston; George A. Fuller Co., Boston, contractor.

221 tons, undercrossing, Colorado Springs, El Paso county, Colo., to unnamed interest.

175 tons, technical junior high school, Auburn, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; W. E. Bouley & Co., Auburn, contractor.

173 tons, high school, Bloomfield Co., Union City, N. J., to Ceco Steel Products Co., Jersey City; through Millimet Construction Co., Union City.

170 tons, dam and power plant, Milford, Mich., to Jones & Laughlin Steel Corp., Pittsburgh.

150 tons, highway project, route 37 section 10, Mercer county, New Jersey, to Igoe Bros. Co., New York; through John Nesto & Co., Newark.

150 tons, three schools, Sacramento, Calif., to Palm Bridge & Iron Works, Sacramento.

150 tons, third addition to court house, San Luis Obispo, Calif., to unnamed interest.

150 tons, Fine Arts building, Teachers college, Terre Haute, Ind., to Calumet Steel Co., Chicago.

109 tons, St. Emyduis school, San Francisco, to Soule Steel Co., San Francisco.

100 tons, federal laboratory buildings, Hamilton, Mont., to Truscon Steel Co., Youngstown, O.; McGough Bros., St. Paul, Minn., general contractor.

100 tons, paving Lake Washington bridge project, Seattle, to Bethlehem Steel Co., Seattle; N. Fiorito, Seattle, general contractor.

100 tons, Thomas Jefferson memorial, Washington, to Bethlehem Steel Co., Bethlehem, Pa., through Rosslyn Steel & Cement Co., Rosslyn, Va.; Chas. H. Tompkins Co., Washington, sub-con-

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ERIE BUILDS *Dependable* HAMMERS

Behind the Scenes with STEEL

Send Me In, Coach!

■ If this department seems a trifle strange, it's because good ol' Shrdlu, the poppa of B.T.S. and Ann, is currently kicking around in Cinci and can't be on deck to regale STEEL's readers with his quaint quips. So Coach Kreutzberg had to send in a substitute —and we're it.

These Figures Talk

■ Over our coffee and crullers this morning we noted that Bethlehem Steel entered 1939 with a record-breaking peacetime backlog of unfilled orders. If this represents a trend, it's music to any steelmaker's ears! Which reminds us—don't miss STEEL's review of fourth quarter 1938 financial reports in this and subsequent issues. These promise to be eloquent figures, showing the effect of such new factors as lowered prices on net earnings.

Cans Can

■ Lapel buttons worn by 15,000 canners at last week's Chicago meetings proclaimed, "A Can a Day Will Do It!"—and they didn't mean beer! In thus promoting products packed in tin cans, it was pointed out that a can-a-day-per-family would empty warehouses of surplus canned goods by summer—and incidentally give a decided boost to the steel industry. Weirton Steel clinched this theme by serving a delectable banquet made up entirely of foods that had been packed in cans. Boy, what an opportunity those conventions must have been for canopener salesmen!

Uh Hope, Uh Hope!

■ STEEL's Detroit sage, Art Allen, established himself as a bit of a prophet last week in writing of the Buick-sponsored broadcast of the Louis-Lewis fight—or shall we say massacre? It was "hoped", said he, that the punch-and-duck party would last more than 2 minutes 19 seconds —the "late" Maxie the Nazi's stint. Well, Art got his hope by precisely one-sixth of a minute —and 10 seconds is a long time in the heavyweight ring. Just ask John Henry Lewis!

Prospectus

■ Checking over STEEL's editorial schedule for the next few weeks convinces us you can't afford to miss a single issue. This week's feature on stainless steel food service gives a startling picture of the important role played by restaurants, hotels and clubs in developing new markets for stainless. Keep on the lookout for a coming story on new decorative applications of untarnishable steel, where it actually replaces silver plate in the manufacture of high quality tableware. Speaking of decorative uses for steel—our editors are preparing a crackerjack story on new methods recently developed for coloring metals. This will appear next month. Just imagine! Some morning you may walk into your office and find it furnished with purple steel filing cabinets, a shiny red steel desk and some snappy green steel bricabrac here and there.

Wings Is the Thing

■ We're pretty enthusiastic about STEEL's new series on the aircraft industry. Understand—we don't pretend to be Rickenbakers or Lindberghs, but we see real significance in the current expansion of aviation and believe it will make its growth felt throughout the metal producing and metalworking industries. Why not follow these articles closely and see where your business can benefit from this new market?

—ETAOIN

tractor.

100 tons, extension to Kanawha boulevard, Elk river bridge, Charlestown, W. Va., to West Virginia Rail Co., Huntington, W. Va.

Reinforcing Steel Pending

2400 tons, Dearborn street subway, section D, Chicago, bids Feb. 2; tonnage revised.

1200 tons, state highway toll bridge, Jamestown, R. I., to Narragansett, R. I.

521 tons, North Figueroa street bridge, Los Angeles; bids Feb. 9.

500 tons, plant, Fisher Body, Grand Rapids, Mich.

500 tons, post office and court house, Fresno, Calif.; bids Feb. 24.

350 tons, over-crossing near Turloc, Stanislaus county, California; new bids Feb. 8.

230 tons, women's dormitory, University of Michigan, Ann Arbor, Mich.

220 tons, music hall, Purdue university, Lafayette, Ind.

200 tons, sewage treatment plant, Pontiac, Mich.

200 tons, alterations, pier 26, Hudson river, New York.

200 tons, Triborough hospital, Queen, N. Y.; John Kennedy & Co. Inc., New York, low at $1,618,000, Jan. 25 bid.

190 tons, state T beam bridge, Snohomish county, Washington; bids at Olympia, Feb. 7.

175 tons, addition, Cambridge High and Latin School, Cambridge, Mass.; bids Jan. 30.

113 tons, three bridges, Tehoma county, California, for bureau of public roads; Joseph Shaw, 11000 Broadway Terrace, Oakland, Calif., low on general contract at $110,000.

112 tons, tunnel lining Willamette highway, Oregon; bids to W. H. Lynch, bureau of roads, Portland, Feb. 8.

100 tons, Samuel Gompers trade school, San Francisco; bids Feb. 8.

100 tons, dormitory, Domincian college, San Rafael, California; bids Feb. 1.

100 tons, public school No. 18, Buffalo; bids Feb. 28.

100 tons, school, Rahway, N. J.

Pig Iron

Pig Iron Prices, Page 72

Pittsburgh—Pig iron is slow, with demand for foundry grades expected to continue quiet unless there is an unexpected rise in railroad equipment orders. Producers of equipment, mill rolls and sanitary ware are inactive. Shipments lag behind production.

Cleveland — Releases are well ahead of December. Auto foundries are less active and jobbing plants have increased operations less than expected, but this has been more than offset by heavier needs of heating and farm equipment manufacturers. Foundry coke shipments this month are at least 15 per cent larger than in December. Pig iron and coke prices are unchanged.

Chicago—Shipments of both pig iron and foundry coke are heavier, the latter being 20 to 25 per cent

ahead of last month. Pig iron shows a smaller gain, but sales are increasing. Demand is well diversified, except for smaller production of railroad castings. Farm equipment builders are preparing for better operations.

Boston—The slight improvement in foundry melt which started last month is maintained and in some instances further mild gains by textile equipment foundries and jobbing shops are noted. This has not yet been materially reflected in an increase in pig iron buying or shipments which are still slow.

New York—Only a very mild improvement in pig iron demand has been noted so far this month. Some sellers doubt the month will represent any improvement over December; others expect a little increase. Orders are confined largely to single carlots. Foreign inquiries also are light.

Philadelphia—Pig iron buying is being a little more than sustained at the December average. There has been a little pickup since inventory season, but orders are still confined largely to carlots.

Buffalo—Shipments continue to rise, though at a slower rate. Immediate delivery requested on many new orders points to low inventories among foundries. Inquiries are more active. Malleable plants are busier in keeping with better railroad inquiries. Schedules of jobbing and specialty foundries range from three to five days a week.

Cincinnati—Deliveries are heavier than a month ago and are approaching the November level. While better shipments reflect improvement in melt, gains in operations are spotty. Buying is quiet, orders being chiefly carload lots.

St. Louis—Pig iron deliveries continue to gain. Better shipments than in December are indicated for January, but new business is negligible. Upturn in the melt is headed by stove plants, though jobbing foundries are moderately busier. Malleable shops are quiet.

Birmingham, Ala.—Although pig iron producers complain of scarcity of shipping instructions, there has been no banking of stacks, 16 remaining in production. Little iron is being stacked.

Toronto, Ont. — Sales are up sharply, melters ordering up to 400 tons at a time. Bookings the past week topped 2000 tons. Foundry iron continues most active, but malleable demand is gaining, with basic practically at a standstill. Steel Co. of Canada Ltd. has blown out one of its blast furnaces for relining, leaving only one stack active in this area and a total of four in Canada.

Scrap

Scrap Prices, Page 74

Pittsburgh — Purchase of 18,000 tons of heavy melting steel by the leading consumer here lowers the market for the No. 1 grade 50 cents to $15 to $15.50. Prices paid were $15.25 and $15.50, while No. 2 steel, constituting part of the order, brought $15. The latter is unchanged from the recent market. More tonnage would have been bought, if available, it is reported.

Chicago—A sizable tonnage of No. 1 heavy melting steel has been bought by a local mill at $14. This leaves the market unchanged at $13.50 to $14. Brokers are paying $13.75 and, in some instances, $13.50.

Cleveland—New buying of iron and steel scrap has been negligible the past week. Routine shipments of miscellaneous grades have been going forward. Quotations are steady although the undertone seems strong.

Boston—Heavy melting steel for export is weaker. Brokers are paying a top of $13.50, dock, for No. 1 and $12.50 for No. 2. Up to a week ago tonnages of the former brought as high as $14. Stove plate and No. 2 cast for dock delivery are off 50 cents, while cast grades for domestic delivery also are easier.

New York—Demand from steelworks and foundries drags. Loading against export orders is steady and negotiations for additional business are under way. Prices generally are unchanged, the bulk of heavy melting moving to ships at $12.50 and

Plant Foreman Gives low-down

"Acorn" Dies and "*Greenfield*" service licked a tough job and saved my neck at the front office," says this Detroit foreman.

"A new heat treatment on ⅜-24 studs was too much for our dies till a "*Greenfield*" man suggested High Speed "Acorn" Dies. And what's more—he delivered them in three hours. We handled our 5,000 motors with the very first die. Some job!"

"Acorn" Dies and "*Greenfield*" service is an unbeatable combination. You, too, can benefit by it.

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"GREENFIELD" TAPS DIES · DRILLS SCREW PLATES PIPE TOOLS REAMERS GAGES SOLD BY DISTRIBUTORS EVERYWHERE

$11, respectively, for No. 1 and No. 2 steel.

Philadelphia—Export demand continues to lend strength to No. 1 steel quotations, with important changes lacking in domestic prices. Foreign buyers are insisting upon a greater proportion of No. 1 steel in relation to No. 2, the ratio having been increased lately to 40 and 50 per cent. Formerly 25 per cent was accepted.

Buffalo—A sale of about 3000 tons of No. 2 heavy melting steel within the prevailing $12 to $12.50 range has tended to bolster sentiment.

Cincinnati — The market is quiet and easier, but quotations are unchanged. Suspension of shipments against recent orders in nearby districts has offset strengthening resulting from this buying. Bids on railroad lists disclose no definite trend.

Detroit—Lists of automotive scrap to be bid this week are 10 to 30 per cent smaller than previous offerings this month. Pessimism is more obvious in the scrap trade, although prices are unchanged. Dealers show little interest in acquiring tonnages.

St. Louis — Some inquiries for heavy melting steel have appeared from mills but disagreement on price has precluded sales. Offerings are lighter, except from railroads.

Birmingham, Ala.—Despite indications that Republic Steel Corp. will enter the market local dealers are not optimistic, quotations on delivered tonnage having been shaved at Gadsden to $12.50 and $13.50 on No. 2 and No. 1, respectively.

Seattle—Tidewater stocks are low and receipts are retarded by the weather. Exporters look for additional Japanese orders, but credits continue tight and as funds are deposited prompt shipment is desired. Local mills are buying occasionally in small lots.

Toronto, Ont.—Changes in activity are slight but for the better, with prices firm. Bundled sheets and heavy melting steel are the most active items. Machinery cast is in demand and stove plate orders are pending.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 71

New business is ahead of December, with some sellers reporting demand better than expected. This applies to both new orders and specifications. However, the industry still is having difficulty moving operations far above 40 per cent. Orders are being booked at substantially better prices than prevailed early last month. Business is diversified, including some railroad tonnage. Stove makers and machine tool builders have increased their specifications.

Warehouse

Warehouse Prices, Page 73

Cleveland—Shipments are steady, with individual orders generally small and well diversified. January deliveries are expected to exceed December by a comfortable margin and further gains are seen for February.

Chicago—January sales are expected to show a gain over December despite recent slackening. Moderately lower volume is looked for in February, with March likely to show recovery. Latest decline in sales has been principally from city consumer, country demand being heavier.

New York—Compared with the first half of January business is off about 5 per cent in number of orders and 10 per cent in tonnage, but the entire month will compare favorably with December. Practically all products are affected but most jobbers believe the lull is temporary.

Philadelphia — January orders were disappointing to most warehouses, business in some cases falling short of December. However, the latter month was better than generally expected.

Cincinnati—Warehouses are gratified over business recovery this month, January tonnage being near the best level attained last year. Sheets continue dull, but bars, plates and shapes are active.

St. Louis—Sales have leveled off but are as good as expected. Demand from nearby coal and oil fields is reported large. Galvanized sheets are moving well.

Ferroalloys

Ferroalloy Prices, Page 72

New York — January shipments of ferromanganese are indicated as ahead of December and comparable with the November movement, best of last year. Prices are unchanged at $80, Atlantic and Gulf ports, the level established earlier in the month. Domestic spiegeleisen is at prices unchanged the past several months, $28, Palmerton, Pa., for 19 to 21 per cent and $33 for 26 to 28 per cent. Other leading ferroalloys also are unchanged.

Ferro Is Imported

Philadelphia—Two shipments of ferromanganese were received here

during the week ending Jan. 21, 131 tons from the Netherlands and 100 tons from Czechoslovakia. A shipment of 222 tons of pig iron from the Netherlands also was received.

Steel in Europe

Foreign Steel Prices, Page 73

London—(*By Cable*)—Iron and steel markets of Great Britain are dull, domestic as well as export. Pig iron trade is featureless. Defense needs provide the only bright spot, recent orders providing about three months work for sheet mills. Producers of heavy steel products are slightly better occupied but still well below capacity. Coke export demand is active.

The Continent reports dullness continues in export demand, especially for bars and structurals. Producers in Western Europe are reported to have orders for about four weeks.

Buoy Chain Tonnage Let

New York—Contracts for 522 tons of wrought iron buoy chain and bridles have been placed by the lighthouse bureau, Staten Island, chain contracts being awarded as follows: Baldt Anchor, Chain & Forge Co., Chester, Pa., $10,863.80; McKay Co., McKees Rocks, Pa., $22,353.41; American Chain & Cable Co., Braddock, Pa., $17,135.87; Carroll Chain Co., Columbus, O., $4648.80; S. G. Taylor Chain Co., Hammond, Ind., $7133.97; International Chain & Mfg. Co., York, Pa., $8968.77, and Columbus McKinnon Chain Corp., Tonawanda, N. Y., $5149.02. Chain is ¾-inch to 1⅝-inch. The successful bidders were all low, f.o.b. place of manufacture.

Iron Ore

Iron Ore Prices, Page 74

Baltimore—A substantial tonnage of ore arrived here in the period from Dec. 19 to Jan. 15, inclusive, iron ore and manganese ore principally. No chrome ore arrivals were reported.

Iron ore arrivals were as follows: 21,700 tons, Cruze Grande, Chile, Dec. 19; 10,500 tons, Daiquiri, Cuba, Dec. 20; 11,500 tons, Cruze Grande, Dec. 24; 7760 tons, Whyalla, Australia, Dec. 24; and 21,800 tons, Cruze Grande, Dec. 25.

Also received were 21,300 tons iron ore from Cruze Grande, Dec. 28; 10,500 tons, Daiquiri, Jan. 2; 21,000 tons, Cruze Grande, Jan. 5; 21,600 tons, Cruze Grande, Jan. 8; 11,300 tons, Cruze Grande, Jan. 9; 21,600 tons, Cruze Grande, Jan. 12; 10,500 tons, Daiquiri, Jan. 15; and 3006 tons, Whyalla, Dec. 28.

Manganese ore imports included 4500 tons, San Diego, Cuba, Dec. 21; 1000 tons, Calcutta, Dec. 21; 1400 tons, Calcutta, Dec. 26; 5700 tons, San Diego, Dec. 29; 2000 tons, Calcutta, Jan. 6; 6100 tons, San Diego, Jan. 13; and 2000 tons, Calcutta, Jan. 15.

Several shipments of ferromanganese were received, including 1478 tons, from Rotterdam, Dec. 21; 700 tons, Porsdrund, Dec. 24; 76 cases, Gothenberg, Dec. 31; 200 tons, Gdynia, Jan. 1; and 1050 tons, and 438 barrels from Sanda.

Webster and Weller Companies Reorganized

■ Webster Mfg. Co. and Weller Mfg. Co., Tiffin, O., which have been operating under trusteeship for several months, have reorganized as Webster Mfg. Inc. The new company has secured capital to carry on extensive manufacturing operations. Incoming business since the first of the year has increased materially.

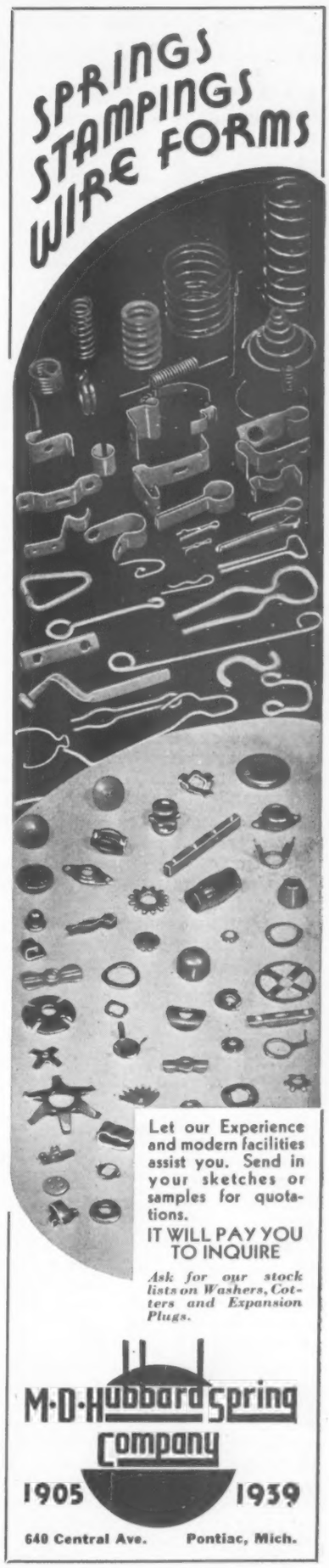
The original Webster company was established in 1876 and has been manufacturing elevating, conveying, power transmission, chains, special machinery, sheet steel work, malleable and gray iron castings. Branch offices have been established in leading cities throughout the country.

Officers of the new company are: President and general manager, K. H. Waterfield; vice president and production manager, W. C. Doemel; secretary, Bert Jody; treasurer, Charles S. Clarke; chief engineer, C S Jones; sales manager, L A. Scheck; purchasing agent, L. F. Maher.

Ten States Seek Ban on Highway Fund Diversion

■ Campaigns for constitutional amendments prohibiting diversion of highway funds to nonhighway purposes are under way in ten states, according to American Road Builders' association, Washington. California, Michigan and New Hampshire approved such amendments in November elections, bringing to seven the total states having barriers against the practice.

To aid the campaigns, the road builders' group will publish a 50-page antidiversion "bible." This will include comprehensive statistics and will outline methods and procedures for obtaining constitutional amendments.


SPRINGS
STAMPINGS
WIRE FORMS
Let our Experience and modern facilities assist you. Send in your sketches or samples for quotations.
IT WILL PAY YOU TO INQUIRE
Ask for our stock lists on Washers, Cotters and Expansion Plugs.
M·D·Hubbard Spring Company
1905 1939
640 Central Ave. Pontiac, Mich.

"What Advertising Means To Machine Tool Builder"

(*Concluded from Page 20*)

one is unwilling to invest advertising money in the procurement of materials out of which good advertising is built, namely, pictures, application data and personnel.

It *is not difficult* when you embrace a point of view which will permit you to go out into the market for what you need, even to the point of writing copy *almost literally* in the customer's shop. That point of view is based on a deep understanding of the fact that you can't build good advertising or anything else worth while without good materials, good tools and good men, who think in marketing terms.

It means that you will advertise, as you expect to sell, according to the rules of accepted marketing practice, according to the best methods of sales application engineering. That point of view is, in fact, an approach to industrial advertising that might be called *advertising application engineering* — advertising that is engineered to fit the best application experience.

But naturally, that isn't the whole story, because alert advertisers must keep on reminding themselves that they are advertising and selling in today's market. Well, what does that mean?

It means the ability and the will to engineer the advertising we do to the trends of industrial advertising today. What are these trends? In my judgment, there are two which stand out among the rest as most important, namely—

1. The trend toward *measuring the effectiveness* of industrial advertising.

2. The trend toward recognizing industrial advertising as an *essential part of the public relations program.*

Result of Challenge

Let us examine the first. This trend is the result of a challenge to industrial advertising in recent years, to "show cause" for its existence on an important scale. Well, how can that be done? The answer is comparatively simple, in principle, if not always in execution. It is based on a survey method, the purpose of which is to determine precisely where—as to reputation—an advertiser may "stand" in the market and in comparison with his competitors. These methods are particularly desirable for industrial companies that have been *out of advertising* for a time, or that have never been in, and where doubts are entertained as to their relative position market-wise.

Let me cite a case in point, in which a "recognition test" was made both before and after an advertising campaign. It was made for one of the leading manufacturers of tool steel. This company had not advertised for several years, and had decided to start a campaign, but wanted to get the "before and after" picture.

You are doubtless familiar with the procedure employed. A questionnaire is sent out on the letterhead of an independent research organization. In this instance, the investigation was confined to the metal working industry; and these two questions were asked:

1. Whom do you consider the leading manufacturers of tool steel?

2. If you were to change your source of supply to whom would you change?

Before the campaign started, this steel company ranked sixth in answer to the first question, and fifth in answer to the second. The advertising campaign was carried on in several of the top papers in the metal working industry; and this campaign was backed up by an appropriate direct mail program.

Repeat Questionnaire

At the end of one year, the same questionnaire was sent to a similar list of names in the same industry. What happened?

Our steel company had moved up from sixth to second position, as determined by the answers to the first question, and from fifth to first position, as determined by the answers to the second question.

This is but one of many such cases that could be cited to show a method for measuring the effectiveness of advertising is practicable; and is available to advertisers who, very properly at times, come to doubt the efficacy of their advertising procedure, if not indeed the efficacy of industrial advertising itself.

As a result of such recognition tests, industrial advertisers who happen to be in doubt, need no longer decide to "do a little advertising" merely on hunch; but may go into a well-planned advertising program on the sound investment of factual market information.

Now let us examine Trend No. 2. This is the trend toward recognizing industrial advertising as an essential part of the public relations program, which Edgar M. Queeny, president, Monsanto Chemical Co. calls "business manners and morals." Chief executives everywhere are becoming increasingly conscious of public relations, which have three main objectives:—Better employe relations; better community relations, and better customer relations as a whole.

Industrial advertising plays a primary role, of course, in better customer relations; and must be conceived and executed to build maximum good will.

The pattern for industrial advertising that I have been discussing should be made to tie in specifically with this trend toward recognizing industrial advertising as an essential part of the public relations program. But in my opinion, such advertising goes only part of the way.

I am living for the day when it will be supplemented and amplified by a broader kind of advertising—call it institutional advertising, if you like—which proceeds on a programmed basis and over the long pull and in various ways (that is, with copy, written from any one of a number of different angles), deliberately to perform a reputation-building function.

It is perfectly true that many of us in the machine tool industry cannot do this job by ourselves either wholly or in part. But those of us who can undertake it and will do it intelligently and follow through on it vigorously, will find our reputations growing apace, in proportion to the intelligence and the vigor of our efforts, and the relative size of our advertising investment.

Even such advertising can find its proper place in the formula of *ADVERTISING APPLICATION ENGINEERING*, because it is advertising that is engineered to the application of building a reputation of which you can be proud, throughout your immediate market and throughout the business community. It is the kind of advertising, more than any other, that stimulates constructive conversation about your company in the shop, on the street and in Pullman drawing rooms.

Necessity for Co-operation

I said, a moment ago, that many of us could not undertake this kind of reputation-building advertising, either wholly or even in part, *by ourselves.* If we do not, or cannot, who will?

My answer to that is a prediction that, both currently and during the next five years, this job is going to be done at an increasing rate by *groups of manufacturers* who have common public relations problems.

Take my own association of machine tool builders, for example. We are keenly aware of the need for a public relations program for the industry that is built on the common ground of selling a more favorable inclination *toward* that industry on the part of machine tool users, the business community and the public generally.

In what I have tried to say, I believe you will find a practical approach to industrial advertising in today's market as well as an expression of my own viewpoint on

what industrial advertising means to a machine tool builder.

It is my personal belief that the future belongs, in richest measure to that manufacturer who is willing to adopt the pattern of advertising application engineering and who applies it in terms of public relations; to that manufacturer who is determined to find out, on an established survey basis, whether or not his own advertising is effective or on what terms it could be made effective; and to that manufacturer who is willing to invest, according to his means, in the idea of putting his industrial advertising to work as a reputation-building force.

Nonferrous Metals

New York—Disquieting foreign political developments unsettled metal markets in London last week which in turn tended to weaken price structures of the domestic markets. Features here consisted of a 10 point decline in pig lead, a slump in tin prices Thursday and a partial recovery on Friday, and a decline in export copper to around the 10-cent, c.i.f., level. There was good buying response to the lower levels in tin and lead while demand for copper and zinc remained spotty.

Copper—Edgar Sengier, managing director of Union Miniere du Haut Katanga, declared that the copper situation is sounder and in better condition than any other raw material. The three leading domestic producers have curtailed production. Offerings of resale electrolytic copper were made down to 10.15c, delivered Connecticut, but all first hands continued to quote 11.25c. Export copper closed fractionally above 10.00c, c.i.f. Casting copper prices are now based on resale electrolytic and closed at 10.05c, f.o.b. refinery.

Lead—Domestic sellers lowered prices $2 per ton to 4.60c, East St. Louis, due to a decline in London to a parity with the previously prevailing level. Consumers bought actively for February delivery.

Zinc—Prime western held at 4.50c, East St. Louis, despite further easing in the foreign market. Sentiment here was buoyed somewhat by the steady rise in the galvanized sheet output rate to 55 per cent of capacity.

Tin—Heavy liquidation of speculative holdings in London caused a sharp reaction of over £4 in standards on Thursday but this loss was almost entirely recovered on Friday. Net loss for the week in standard spot was £3 10s. Sellers remained reserved here although they satisfied the fair volume of inquiry which came out at the lower levels.

Antimony — American antimony

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Jan.	Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
21	11.25	11.37½	10.77½	46.50	46.65	4.85	4.70	4.50	20.00	11.75	35.00
23	11.25	11.37½	10.77½	46.15	46.25	4.85	4.70	4.50	20.00	11.75	35.00
24	11.25	11.37½	10.77½	46.25	46.35	4.75	4.60	4.50	20.00	11.75	35.00
25	11.25	11.37½	10.77½	46.00	46.10	4.75	4.60	4.50	20.00	11.75	35.00
26	11.25	11.37½	9.87½	45.15	45.25	4.75	4.60	4.50	20.00	11.75	35.00
27	11.25	11.37½	10.05	45.85	45.85	4.75	4.60	4.50	20.00	11.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high) 17.31
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 20.06
Seamless copper 19.87½

Rods

High yellow brass 12.62
Copper, hot rolled 15.87½

Anodes

Copper, untrimmed 16.62½

Wire

Yellow brass (high) 17.56

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.25-6.37½
Cleveland 6.50-6.75
Chicago 6.00-6.25
St. Louis 6.12½-6.37½

Heavy Copper and Wire

New York, No. 1 ..... 7.87½-8.00
Cleveland, No. 1 ..... 7.75-8.00
Chicago, No. 1 ..... 7.50-7.75
St. Louis 7.62½-7.87½

Composition Brass Borings

New York 5.40-5.65

Light Copper

New York 6.25-6.50
Cleveland 6.00-6.25
Chicago 5.87½-6.12½
St. Louis 6.12½-6.37½

Light Brass

Cleveland 3.25-3.50
Chicago 3.75-4.00
St. Louis 3.87½-4.12½

Lead

New York 4.00-4.25
Cleveland 3.50-3.75
Chicago 3.75-4.00
St. Louis 3.50-3.75

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.25-2.50

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 6.75-7.00
Clips, soft, Cleveland 14.25-14.50
Mixed cast, St. Louis 7.00-7.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads . 10.50
Standard No. 12 aluminum . . . 12.75-13.25

BY THE BOX OR BY THE MILLION!

• For many years Cleveland Cap Screw Company has been a principal source of supply for flat head and filister head cap screws as well as for hexagon head cap screws and all types of set screws. A complete list of sizes is stocked at the plant and at our four warehouses, ready for immediate shipment. The same exacting care used in making hexagon head cap screws is used for flat head and filister head products. Thread accuracy, tensile strength and full finish are excellent, for the standards of manufacture are, of course, the same. Ask for samples and Catalog E, and current price list. THE CLEVELAND CAP SCREW CO., 2935 E. 79th Street, Cleveland, Ohio.

Address the Factory or Our Nearest Warehouse:

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA . 12th & Olive Sts.
NEW YORK . . . . 47 Murray Street
LOS ANGELES . 1013 East 16th St.

CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS

declined ½-cent on Friday due to the prevailing slow rate of consumer buying interest. Spot was quoted 11.25c, New York, and 11.00c, shipment in bulk from smelter.

Equipment

New York — R. W. Kaltenbach Corp., Bedford, O., is apparently low on dry dock cranes for navy yards at Boston, Philadelphia, Mare Island and Puget Sound with a bid of $495,000, Jan. 25, bureau of yards and docks, Washington. Spec. 9003.

Boston — Machine tool orders stepped up encouragingly during the last 10 days, notably heavy metal-working equipment for at least two shipyard shops, Bethlehem Shipbuilding Co., Fore river, Quincy, Mass., and New York Shipbuilding Corp., Camden, N. J.

Additional orders have been placed by the aircraft industry with a slight gain also noted by miscellaneous metal-working plants. Retooling at the Springfield, Mass., armory continues with new equipment being purchased for the production of new type of automatic rifle.

Some attractive orders for Springfield have been placed and pending needs include screw machines, broaches, lathes, automatic millers, hydraulic shapers, boring machine, multiple spindle drilling machines, presses and smaller equipment.

Cleveland—Machine tool sales continue at the improved December and January level, although a substantial increase in inquiries presages heavier sales in February and March. Large orders are rare in the district, but a steady volume of miscellaneous business makes the total satisfactory. Dealers expect early release of more government business which, directly or indirectly, will affect tool sales. Domestic sales are expected to increase in relative importance through the spring months.

Chicago—Machine tool business continues at the satisfactory level of the previous week, with sellers expecting present volume will be maintained. Inquiries are reported slightly heavier. Although several large lists recently closed, numerous sizable orders still are actively pending. A decided upturn in demand for plate fabricating equipment has been felt.

Seattle — Public works projects dominate the market as private industries are not making important replacements. General Electric Co. is low to bureau of reclamation, Denver, for furnishing generators for Shasta dam, California, at $2,490,999, f.o.b. Schenectady, N. Y. Vancouver, Wash., is in the market for grader, power roller, concrete mixer and work trucks. Markey Machinery Co., Seattle, has the subcontract for deck machinery, steering gear and other equipment for vessels building here for coast and geodetic survey and United States engineers. Bonneville administration, Portland, has called bids Feb. 10, for furnishing airway light equipment, searchlights, circuit breakers, switches, etc., for the Bradford island crossing, Oregon.

Construction and Enterprise

Ohio

ASHLEY, O. — Village, R. A. Whipple, mayor, is taking new bids due at noon, Feb. 3, on construction of an iron removal plant and water softener costing $17,500. Certified check, bond or draft 5 per cent to accompany bid. Hoover & Montgomery, Columbus, O., consulting engineers. (Noted Dec. 5.)

CLEVELAND—Eaton Mfg. Co. has awarded individual contracts for construction of a 50 x 350-foot extension to its stamping plant at total cost of $75,000.

GAMBIER, O.—Village, H. C. Parker, mayor is taking separate bids to noon, Feb. 3, on constructing a sewerage system and sewage treatment plant costing about $60,000. Includes Imhoff tank and ejector station. Certified check, draft or bond 5 per cent to accompany bid. Paul Uhlmann, Columbus, O., consulting engineer. (Noted Nov. 7.)

KENT, O.—City, W. K. Harvey, has received and is studying preliminary report on waterworks system improvements costing more than $100,000. Consulting engineer in project is R. F. MacDowell, Cleveland.

MUNROE FALLS, O.—Munroe Falls Machine Co. has been incorporated with 250 shares no-par common stock to engage in general machine dealing. Officers are Harold Infield, Arthur Williamson and Rupert Minns, Akron, O.

NAPOLEON, O.—Village, Earl Wirick, clerk, is taking bids until noon, Feb. 9, on individual or combined contracts in project to construct various improvements in its water and light plants. Froelich & Emery, Toledo, O., consulting engineer.

WAUSEON, O.—City, Herbert Demaline, mayor, is taking bids due Feb. 28 on construction of sewers and sewage treatment plant costing about $80,000. Project involves chemical precipitation system, sludge digestion and trickling filters. Champe, Finkbeiner & Associates, Toledo, O., consultants. (Noted Jan. 9.)

Massachusetts

CAMBRIDGE, MASS. — Lever Bros. Co., F. A. Countway, president, has awarded contract for construction of a brick, steel and concrete manufacturing plant to Stone & Webster Engineering Corp., Boston.

GREENFIELD, MASS. — City takes bids in March on contract 2 for construction of sewage disposal plant to cost $150,000. Metcalf & Eddy, Boston, consulting engineers.

New York

EAST FRANKFORT, N. Y. — Town board plans for building a sewerage system and sewage disposal plant costing more than $25,000. M. Tuttle, supervisor.

SYRACUSE, N. Y. — Crucible Steel Co., 104 Magnolia street, has plans completed and will soon take bids on an addition to its plant at cost of $500,000.

TROY, N. Y.—Troy Foundry Co. Inc. has been formed to manufacture castings. Tierney & Kenney, 209 Cannon building, are company's representatives.

Pennsylvania

FRANKLIN, PA. — City is taking new bids, due Feb. 10, for construction of a sewage disposal plant, cost estimate at $206,000. Morris Knowles Inc., Pittsburgh, consulting engineer in project. (Noted Dec. 12.)

LEWISBURG, PA. — Citizens' Electric Co., J. M. Grundy, director, is making survey for construction of a light and power plant costing over $50,000.

MARTINSBURG, PA. — City, A. E. Martz, council president, has completed preliminary plans for construction of a sewage treatment plant and sanitary sewerage system estimated to cost a total of $129,000. F. M. Hunter, Altoona, Pa., consulting engineer.

SHARON, PA. — City, Fred Williams, clerk, is receiving bids due 10:30 a.m., Feb. 14, on part of $375,000 project involving construction of sewage disposal plant. Consulting engineers, Chester Engineers, Pittsburgh.

Michigan

JACKSON, MICH.—Consumers Power Co., 212 West Michigan, Dan Karn, general manager, proposes improving seven power substations. Program is a part of Section E of company's $16,000,000 expansion program involving extensions in substations and distribution system, and plant construction.

Illinois

CHICAGO — Allegheny-Ludlum Steel Corp., Brackenridge, Pa., has awarded contract for a two-story, 84 x 236-foot warehouse estimated to cost $100,000 to Austin Co., 510 North Dearborn street.

Indiana

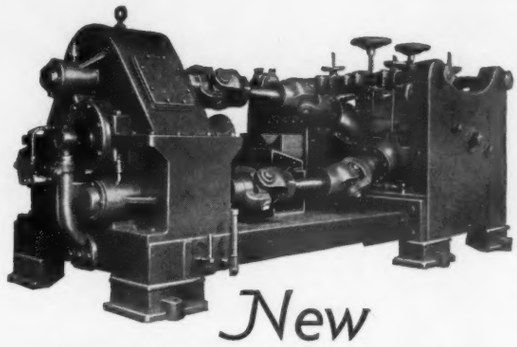
LA PORTE, IND. — E. M. Laird Airplane Co. plans construction of a one-story brick factory costing approximately $50,000.

District of Columbia

WASHINGTON — Navy department, yards and docks, takes bids on pumps, piling, plumbing and air conditioning equipment (specification 8970) for a $4,000,000 graving dock at the Bremerton, Wash., navy yard.

Florida

JACKSONVILLE, FLA. — A. P. W. Co., D. G. Hollister, president, Albany, N. Y., plans to build a paper manu-



New

CONTINUOUS AUTOMATIC STRAIGHTENING *and* POLISHING Bar, Tube *and* Wire Machines

Combine all the necessary features of Speed, Precision, Capacity and Safety... Steel rolls set in Medart-Timken Bearings...Driving gears completely enclosed...Also Continuous Automatic Centerless Round Bar and Tube Turners, built in several types.

THE MEDART COMPANY • *General Offices and Works:* 3520 De Kalb St., St. Louis, Mo.

MEDART

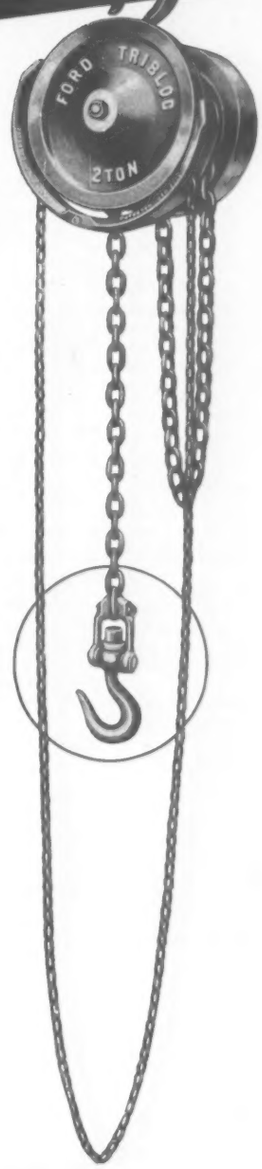
Heading Specialists

Economy-minded **buyers of made-to-order screws and headed parts are discovering real savings in PROGRESSIVE cold upset products. They have found that many parts now milled from the bar can be headed efficiently and accurately with our modern equipment — at reduced costs. We invite you to submit samples or outline ideas to our specialists. Their advice — intelligently and promptly given — may show you the way to greater fastening economies.**

QUALITY PROMCO BRAND

The PROGRESSIVE MFG. CO.
TORRINGTON · · · CONNECTICUT

TRIBLOCS *made by* FORD



—Speed Your Work

—Save Your Dollars

Because the Ford Tribloc is fast, powerful, easy to handle it gets your lifting jobs done in shorter time. For these same reasons—and because it is very durable—it saves you many dollars during its long, faithful working life.

Every Ford Tribloc must pass a 50% overload test before it comes to you. This assures your getting all the value built into its spur gear construction by certified malleable castings, high grade drop forgings and ACCO High Carbon Heat Treated Chain of high elastic limit and high tensile strength.

The price of any Ford Tribloc ... from ¼ to 40 tons ... is surprisingly low.

BUY ACCO QUALITY *in Ford Triblocs and other Ford Hoists—and in Page Welding Electrodes, Lay-Set Preformed Wire Rope, Reading-Pratt & Cady Valves, Campbell Abrasive Machines, American Welded or Weldless Chains.*

FORD CHAIN BLOCK DIVISION
PHILADELPHIA, PENNSYLVANIA

ACCO TRADE MARK

AMERICAN CHAIN & CABLE COMPANY, Inc.
In Business for Your Safety

facturing plant costing more than $1,000,000.

North Carolina

GREENSBORO, N. C.—Monarch Elevator & Machine Co., C. Fred Carlson, president, will erect a manufacturing plant to cost $20,000. (Noted Nov. 9.)

HAW RIVER, N. C.—Town has plans in progress for constructing a water and sewer system to cost approximately $75,000. Will apply to PWA for loan.

South Carolina

CHARLESTON, S. C.—South Carolina public service authority, Charles Gerald, secretary, will advertise for bids probably to be due about March 1 for construction of Pinopolis power dam and locks to cost an estimated $3,000,000 with equipment. Harza Engineering Co., Charleston, consulting engineer.

Tennessee

CHATTANOOGA, TENN. — Electric power board, L. J. Wilhoite, chairman, receives bids Feb. 7 for sub-project, contract No. 7-M, including meters and accessories, tools and supplies for an electric distribution system.

GALLATIN, TENN.—City will receive bids Jan. 31 for construction of a complete electric distribution system estimated to cost $115,000. (Noted Oct. 24.)

MEMPHIS, TENN.—Light and water division receives bids for proposed work on following dates: Feb. 9, substation underground duct lines and cables, $61,000; Feb. 13, distribution transformers, $50,000; Feb. 16, overhead distribution circuits, $315,000.

Louisiana

ABBEVILLE, LA.—REA has allotted a total of $659,000 to Southwest Louisiana Electric Membership Corp., H. B. Bowles, Lafayette, La., superintendent, to finance construction of 771 miles rural electric power lines in six counties. William G. Morrison, Waco, Tex., consulting engineer.

Missouri

ST. LOUIS — Wheeling Corrugating Co., manufacturer of metal products, J. A. Watkins, Wheeling, W. Va., southwestern manager, is erecting a 4-acre warehouse and distributing building at estimated cost of $500,000.

Oklahoma

MIAMI, OKLA.—Muskogee Iron Works has contract to build a $100,000 plant here for Barnsdall-Tripoli Corp., Seneca, Mo. Plant is to be all-steel, 93 x 112 feet, will have crusher, tube mill, drier and screens.

Wisconsin

MILWAUKEE — Nunn Bush Shoe Co. has awarded $50,000 contract to E. Steigerwald & Sons Inc., 5310 West State street, for constructing a one-story, 50 x 90-foot power plant for its factory. (Noted Dec. 5.)

MILWAUKEE — Kearney & Trecker Corp., West Allis, Wis., has awarded general contract to Klug & Smith Co. for designing and building an 80 x 100-foot addition to its plant.

MILWAUKEE — Wisconsin Electric Power Co., G. W. Van Derzee, general manager, announces it will spend $2,500,000 during 1939 in improving its electric service facilities. Largest part in program to be purchase of transformers for 132,000-volt substations.

Minnesota

MADISON, MINN. — City, James Hayden, clerk, will soon call for bids on a new 2500-kilowatt diesel-electric unit. Perkins & McWayne, Sioux Falls, S. Dak., consultant.

TRACY, MINN. — City, H. M. Algyer, recorder, has extended to 7:30 p.m., Feb. 6, closing date for bids on alterations to its sewage disposal plant, including new Imhoff tank, trickling filter and sludge beds, at estimated cost of $27,000. P. C. Bettenburg, St. Paul, consulting engineer. (Noted Jan. 16.)

Texas

AUSTIN, TEX.—Lower Colorado river authority, Fritz Englehard, chairman, board of directors, Littlefield building, receives bids Feb. 3 for transformers and switchgear to be installed in power substations.

BARTLETT, TEX.—City, R. G. Miller, mayor, plans to construct a sewage disposal system, including three filter beds and motor-driven sump pump; may hold bond issue vote. Municipal Engineering Co., Dallas, Tex., consulting engineer.

BENAVIDES, TEX.—City, R. Rames, mayor, has approved issue of bonds to finance construction of projected waterworks and sewerage system costing $140,000. Garrett Engineering Co., Houston, Tex., consulting engineer. (Noted Dec. 12.)

KAUFMAN, TEX.—Kaufman Electric Co-operative Inc. has been allotted $110,000 REA loan to extend rural power lines by 118 miles. Freese & Nichols, Ft. Worth, Tex., consulting engineers.

LA GRANGE, TEX. — Fayette Electric Co-operative Inc. has received an REA allotment and will take bids soon on constructing 134 miles rural electric lines in three counties at cost of $122,000. G. E. Adamcik, project superintendent.

Kansas

GRINNELL, KANS.—City, H. F. Struckhoff, mayor, will receive bids about Feb. 1 on construction of a water distribution system costing about $40,000. Paulette & Wilson, Topeka, Kans., consultants.

KANSAS CITY, KANS. — Board of public utilities plans to build a steam or electric-driven pumping station costing $515,000 for its water system. Burns & McDonnell, Kansas City, Mo., consulting engineers.

LINCOLN CENTER, KANS. — City, F. A. Aufdemberge, mayor, will probably start work soon on construction of a sewage disposal plant and booster stations to cost about $45,000. Paulette & Wilson, Topeka, Kans., consulting engineers.

NARKA, KANS. — City, E. F. Kenne, mayor, will soon take bids on furnishing a vertical turbine pump for its waterworks plant. Paulette & Wilson, Topeka, Kans., engineers.

OTTAWA, KANS.—City, L. I. Crater, clerk, is taking bids to 10 a.m., Feb. 3, on furnishing two steam generating units for the municipal power plant. Black & Veatch, Kansas City, Mo., consulting engineers.

South Dakota

MADISON, S. DAK. — Sioux Valley Electrification association, E. G. Sanderson, Aurora, S. Dak., president, has been organized to construct 250 miles of electric lines serving 600 rural consumers in four counties.

Nebraska

AURORA, NEBR. — Hamilton County Rural Public Power district, Thomas Williamson, president, has awarded contract to Elkhorn Construction Co., Norfolk, Nebr., at $144,762, for constructing 204 miles rural electric power lines in three counties. (Noted Jan. 9.)

Iowa

AKRON, IOWA — Village, Alvin Manning, clerk, is taking bids to 10 a.m., Feb. 14, on installing a diesel engine generator unit and making other improvements in municipal power plant. Certified check 5 per cent to accompany bid.

MANNING, IOWA — South Crawford Rural Electric co-operative, H. W. Frank, superintendent, will soon take bids on constructing 175 miles rural electric transmission lines at cost of $164,000. REA allotment is approved on project. A. W. Grubb, Vinton, Iowa, consulting engineer.

Montana

DILLON, MONT. — City, D. A. Galt, mayor, contemplates constructing a new municipal light and power plant.

Pacific Coast

LOS ANGELES — Metropolitan water district, F. E. Weymouth, 306 North Third street, representative, proposes to build a water filtration and softening plant costing $3,200,000, for the Colorado river aqueduct.

CHEHALIS, WASH. — Public utility district No. 1, C. A. Miller, superintendent, has REA allotment and takes bids soon on construction of generating facilities to cost $31,000.

SEATTLE — Panama Machinery & Equipment Co. has purchased buildings at 1024-28 First avenue and is planning to make extensive alterations and improvements for plant purposes.

TACOMA, WASH.—City has approved a $135,000 appropriation and will invite bids soon for equipment to be installed in Cushman and Nisqually power plants and a substation. Included are: high-tension switching system, low-voltage switches, oil system and six 4-kilovolt switches.

WHITE SALMON, WASH. — City and town of Bingen, Wash., have joined in proposed construction of a sewage disposal system and have instructed consulting engineer G. D. Hall, Yakima, Wash., to prepare plans for a plant.

Alaska

FAIRBANKS, ALASKA — City takes bids to March 6 on construction of sanitary sewers and two sewage pumping plants to cost more than $25,000.

Canada

HESPELER, ONT. — Municipality, M. E. Jardin, clerk, proposes to build a sewage disposal plant costing $105,000. W. A. Spellman, Kitchener, Ont., consulting engineer.

MONTREAL, QUE. — Teleflex Ltd., care of D. C. Abbott, 35 Aberdeen avenue, Westmount, Que., has plans which will mature soon for constructing a plant costing approximately $50,000 for manufacturing and processing metals.

READER *Comments*

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Keeps Yearbook all Year

To the Editor:

We wish to take this opportunity of complimenting STEEL for the magnificient annual issue dated Jan. 2. It is a credit to those participating in this issue, both from the standpoint of reading and advertising matter.

I have spent about three hours going over the issue as it contains valuable information reader-wise, to say nothing of constructive thoughts which it leaves one from the advertising standpoint. We always keep this issue, as the data are so valuable that it answers a great many questions.

J. T. SOMERS

President,
Wyckoff Drawn Steel Co.,
Pittsburgh

Thinks it Best Yet

To the Editor:

We want to assure you that your 1939 Yearbook of Industry has had our careful attention and the comments in our organization have all been extremely favorable.

The makeup of the magazine is, we believe, superior to any that you have previously put out and the typography is good. We find it an extremely interesting issue.

JOHN LUCAS

Sales Manager,
The Yoder Co.,
Cleveland

Issue Is Well Named

To the Editor:

The Jan. 2 issue of STEEL may truthfully be regarded as a "Yearbook of Industry." From an advertising point of view we recognize it as a very valuable issue, and one which we suspect most manufacturing concerns will want to keep throughout the year, as it contains useful information and statistics.

I am very much impressed with this issue and feel certain that every advertiser in STEEL feels the same. I congratulate you on the splendid job you have done.

R. C. BYLER

Advertising Manager,
SKF Industries Inc.,
Philadelphia.

Browsing Brought Pleasure

To the Editor:

I have not had sufficient opportunity to completely digest the contents of your 1939 Yearbook of Industry but I have browsed through it with the result that I believe it carries a good many very interesting messages. I was particularly interested in the one devoted to material handling equipment, which subject you seem to have covered quite thoroughly.

When I have an opportunity to catch up with my work, which has been interrupted by a couple of weeks' illness, I shall certainly make it a point to take full advantage of the many fine articles which appear in this publication.

C. B. VEIT

Sales Manager,
Wright Mfg. Division,
American Chain & Cable Co. Inc.,
York, Pa.

"Hand Forging on Way Out"

To the Editor:

I was much interested recently in an item in *Industrial Britain,* published by the Travel and Industrial Development Association of Great Britain and Ireland, London, anent the passing of Sheffield hand-forged scissors and pocket knives.

Predicting that in less than 30 years these scissors and knives will be "rarer than precious stones," the publication continues:

"It was stated at a recent meeting of the Society for the Preservation of Old Sheffield Tools that there are no more than 20 craftsmen in the city—the youngest over 30—capable of making hand-forged scissors, and there are only 50 to 60 pocket knife forgers, none of them young.

"There is still an appreciable demand for hand-forged articles, the secret of their superiority being that the more steel is hammered the better it becomes, the finer and more durable its cutting edge. A hand-forged pocket knife blade is hammered probably 100 times in forging, whereas a drop-stamped blade is hit only once, a heavy, pressing blow."

Thus, in the midst of the undeniably rapid progress in making better steels for varied purposes, there remain instances where the old craft methods have points of superiority. Perhaps demand for the hand-forged articles may be sufficient to induce some younger men to continue the craft and prevent its entire extinction when the men now skilled in such production have passed from the scene.

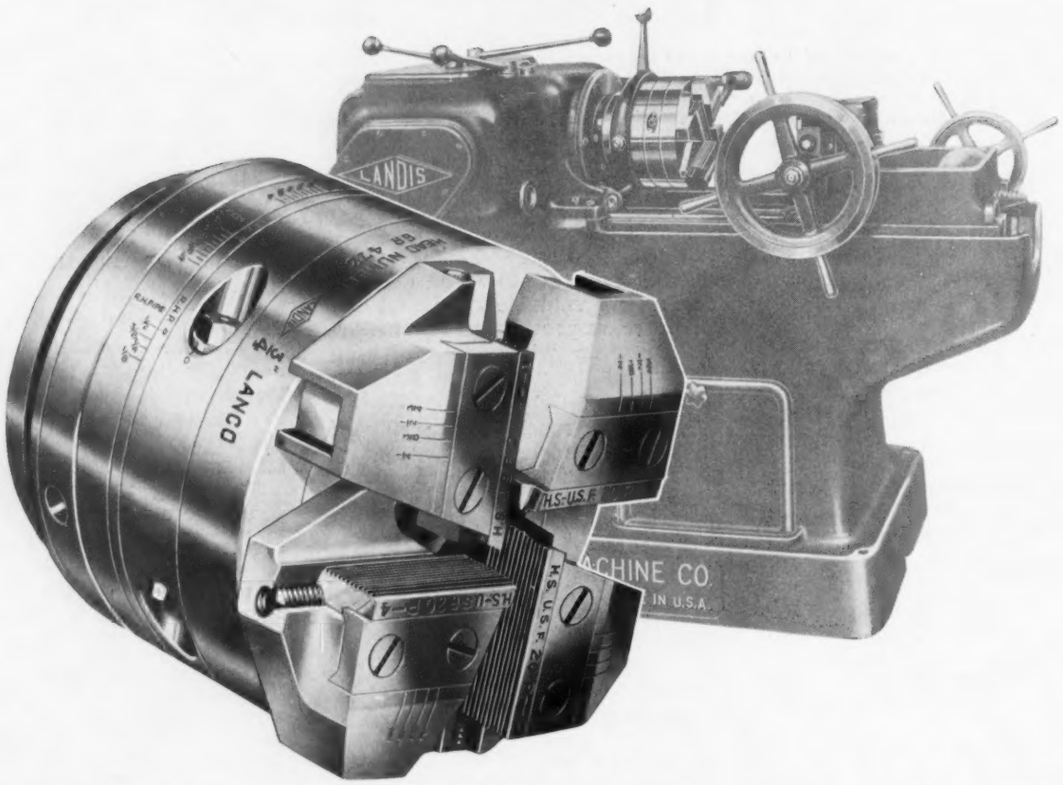
THOMAS EVANS

Pittsburgh

The THREADS of Industry

U.S.S. (N.C.) THREADS—are most generally used by industry

LANCO Heads Assure Accurate Threads and Increased Production



One large Eastern bolt and nut company use LANCO Heads for producing continuous thread chrome nickel steel studs.

The studs are first threaded in 10 ft. bars and then cut to length. A typical example of LANCO Head superiority on this job is the results which are obtained when threading $1\frac{1}{4}''$ diameter, 8 P. U.S.S. threads on SAE 3135 steel. An average of 34 linear feet of stock is threaded per hour. The threads are held to class 4 specifications. By a previous method 12 linear feet were threaded per hour.

An increase of almost 200 per cent.

Are you interested in increasing production. Write us today.

This THREAD Outline

Illustrates the U.S.S. thread form, now more commonly identified as N.C. (Nat'l Coarse).

The N.C. form of thread is in general use in all industries for Studs, Bolts, Cap Screws, and other threaded parts.

The most important properties of the N.C. Thread form is its strength and its machinability.

Landis Machine Co., Inc.
Waynesboro, Pa.